COAL AGE

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Coal Age is entering the third year of its growth. All expectations have been surpassed. It is probable that this journal now has a larger circulation than any other mining paper in the world. 'Tis a record of which we need not be ashamed.

But with it all, we are not satisfied. We must have the lowest accident rate, although our business is the most hazardous. We must have the most contented body of workmen, notwithstanding the dreariness and drudgery of laboring each day in dust and darkness.

You say, "Fine talk, commendable sentiments, but easier said than done." Of course, it's not easy. The attainment of any ideal condition is the result of persistent effort—so much more reason why we must all lend a hand. At least if we can't render material service to the betterment of coal mining, we can refrain from discouraging those who have their shoulders to the wheel.

The success of every mine official is measured by the results he obtains. It's the cost sheet and the accident roll which most interest stockholders and directors. No manager can carry the burden of his entire operations; he is dependent on the efficiency of his superintendents. The latter are often made or broken by their foremen, and the foremen can't get coal out with safety and economy if the miners are ignorant or careless.

Every man engaged in the production of coal is "His brother's keeper." A "slip-up" in the mines may cost, not one, but many innocent lives. Education is the solution, and no man should be too busy to keep himself informed as to the progress of the industry. Originality and initiative are not everything; ability to grasp and utilize the essentials that have made the other fellow successful is a quality that marks the industrial leader.

If all this be true, then every coal man should regard the papers devoted to his particular business with a sense of proprietorship. They have been created to bridge the chasm between him and his brothers in other fields. He should not only read what they say, but should express his own thoughts, tell of his individual exploits and relate the results of his company's experience.

The manager or superintendent who won't look beyond the limits of his own backyard is doomed. The foreman or fireboss who refuses to see over the fence at his particular colliery is already booked for the discard. The miner who is satisfied to be a miner all his life need not fear that "Opportunity" will lasso him and force honor and success down his throat. Such things happen in dreams, but in real life we labor and fight for all we get.

You want a fireboss' or foreman's certificate—then study our instruction pages conscientiously for a few months, and you'll have no trouble in realizing your ambition. Perhaps your aim is to land a job as "super" at some plant where you can show your real worth; the advance will come to you sure as death if you have the requisite knowledge and ability. The man who is too busy or too smart to absorb further education is booked for an early and indefinite vacation, without salary or old-age pension.

Commence today. Adopt a plan based on so much study per week—it may be only one evening or one hour—the results will justify all the time you can give. And this goes for the man who is sixty, as well as for the one who is twenty; it applies to the mine manager as much as to the man who is loading coal at the face of a room.

And don't forget to show people you are still alive. Enter into our discussions, ask us questions, write an article describing something of interest at your mine. It may all seem commonplace and uninteresting to you, but probably the man at the colliery down the river or over in the next county will get a good idea from what you are doing at your eplant. Coal Age will pay you liberally fo very word published. For instance, if your can write a foreword of 500 words worth printing on this page, we will pay as much as $20 for it. Let us hear from you NOW.

The Certificate Law

By Charlton Dixon*

It is but a few years ago that the mine foreman was not required to pass an examination to prove his ability to fill that position in the mine. Before the adoption of the law requiring the certification of mine foremen, the entire country presented a wide field for employment. The mining man could go to any coal-mining state, and a position was open to him if he was a competent man. This condition had the advantage that many good men found their way to different states and districts.

That day has passed. The certificate law, so prevalent in most mining states, practically confines men to a certain prescribed territory, as it prevents their going to other states, without taking another examination and obtaining a certificate in that state.

When one reflects that the conditions, in different states, are very much the same in respect to the methods and systems of mining, the laws and regulations controlling the operation of mines, as well as labor conditions, it would seem only a wise provision if each coal-mining state would pass a law *making the holders of a duly authorized certificate of competency in another state, eligible to hold a like office in that state also.* The law could be so drawn as to protect the state against imposition, by specifying certain limitations to govern the practice.

Such a law would encourage the interchange of intelligent mining men and could not fail to prove an advantage. It would also provide a means by which ambitious young men could obtain a wider experience and increase their competency. It would prove a particular advantage in those states where a certificate law had been in force for several years, and, in which, as a result, there is an over-supply of qualified men.

The British Government granted such a privilege to her qualified officials some years ago by sending them to the colonies where, in many cases, the language and conditions differed materially from those with which they were familiar. The idea is worthy of consideration, and a discussion of this subject would be interesting and profitable.

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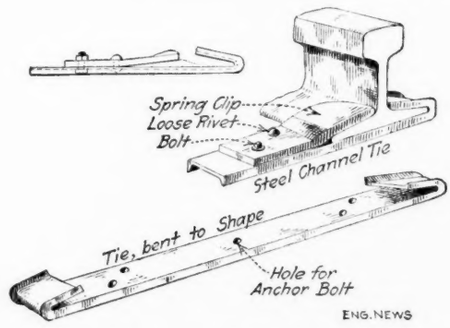
A Steel Channel Tie for Mine Tracks

The steel tie is becoming the approved support for the rails in the rooms of mines, largely because of the economy of space its use affords. It seems, however, that it has a marked adaptability for outside and heading tracks. It is true that it tends to bend when subjected to the heavy straining thrusts of the hoofs of mules, and these thrusts also tend to move the tie from its proper place in the track. These defects are met, however, by the W. H. Coffman tie, because instead of the bearing surface being flat, it is channeled, which increases its strength and by indenting the floor prevents slipping.

It would seem that the saving in ballast is an advantage which would serve with the reduction in the ties needed, to pay for their greater cost. Where the floor is hard, the laying of a few steel ties on the bottom of the cut or on the top of the bottom rock will be better than using wood ties and bringing in crushed ballast from outside. The maintenance of ditching with a shallow track is cheaper than with one which is of standard depth, especially where that track has to be kept close to a traveled road, as in a mine heading.

The ties are made of ½-in. steel, and they weigh from 1.75 to 1.90 per running foot. They have already been in use for years. *Engineering News* thus describes the tie: A form of steel tie for mine tracks, which is now being introduced in the mines of the Pocahontas coal field, consists of a light channel having the ends bent back so as to fit over the outer side of the rail base. The fit is close enough to require the rail to be driven in with some force, thus insuring a tight grip on the rail. On the inner side of the rail is a clamp held loosely by a rivet, so that it can be swung aside to allow the rail to be placed in position. The clamp is then driven back into line with the tie so that it grips the inner side of the rail base. A bolt can be fitted in the tail of the clamp, to keep it from working loose, but this is



Steel Channel Tie for Mine Tracks, with Spring Clip Fastenings for the Rails

rarely used, as the clamp is slightly sprung when driven on the rail, so that it exerts a direct pressure and would require some force to displace it. At the middle of the tie is a hole for an anchor rod which is driven in the roadbed and prevents creeping of the track, but we are informed that this is not always necessary.

The channel is $2 \times \frac{9}{16}$ in., $\frac{3}{16}$ in. thick, and is bent cold to shape in a machine specially designed for the purpose. A form of steel tie used somewhat extensively in these mines is made from a flat bar $1\frac{1}{2} \times \frac{1}{2}$ in., weighing 2.55 lb. per ft., but this is not so stiff as the channel of lighter weight. The price for the channels, however, is a little higher than that for the bars. For track of 44-in. gage the channel is 50½ in. long, and the two spring clamps are 6 in. long. Such a tie will weigh 9½ to 10 lb.

A special advantage of the steel tie is its shallowness as compared with wood ties, and it is said that this is sufficient to enable 8 or 9% more coal to be carried in each car. It also enables the rails to have a bearing on the floor of the mine, so that track will keep in better surface than when the rails are unsupported between the ties. Under these conditions it is stated that the steel ties may be spaced 5 to 8 ft. apart, especially if the cars are not heavy and are operated by mules. Some of the steel ties, however, are used on tracks operated by electric motors. Separate short pieces of steel channels (not attached to the rails) may be placed longitudinally under the joints or at intermediate points.

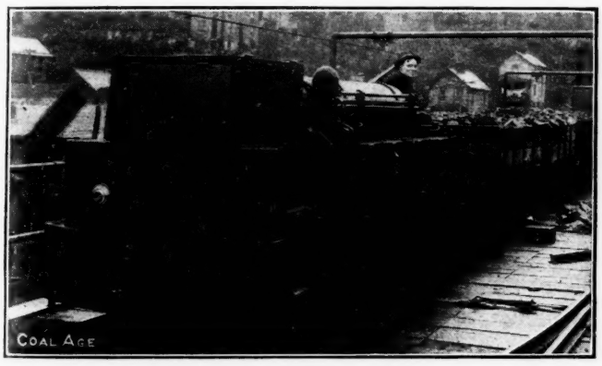
These steel channel ties and the bending machine used in their manufacture are the invention of W. H. Coffman, Bluefield, W. Va.

The Largest Mine Locomotives

The Carnegie Coal Co. recently installed in Charleroi, Penn., two of the largest mine locomotives ever built. These machines weigh 30 tons apiece and are of the Baldwin-Westinghouse "barsteel" type. It is estimated that each can haul a trip of 100 cars of 3 tons capacity each over the local grades.

The Carnegie company recently acquired possession of the Charleroi mine, which is of considerable size and well developed. A large production was desired, but the haul is about two miles in length with the grade largely against the load. The average haulage locomotive of from 15 to 25 tons weight would not be sufficiently large to keep production up to the desired amount, consequently the installation of these extra large machines was decided upon.

These locomotives possess a number of interesting features. Each machine consists of two separate units, which can be parted and used as 15-ton locomotives if desired. This arrangement of two units in tandem is advantageous in large machines because the weight is distributed over eight wheels instead of four. The locomotive possesses therefore not only great power, but is also



LOCOMOTIVE ON TIPPLE TRESTLE

easier on the track than if the weight were more concentrated.

The "barsteel" side-plate construction is of modern origin. As may be clearly seen in the illustration the frames are not built up of plates, but are grids of cast-steel bars of heavy cross-section. Each side-frame is a unit casting thus forming an extremely strong and rigid construction.

The openings between the bars of the frame give ready access for inspection, oiling, placing brake shoes, adjusting brake rigging, etc. It also provides thorough ventilation for the electrical apparatus so that its all-day efficiency is higher than would be the case if the frame were totally inclosing. This type of construction has been in use for many years on large freight locomotives, but has only recently been adopted for mine haulage.

Air brakes are used, owing to the greater ease of handling so large a locomotive, but each unit is equipped with hand brakes, which can be operated together or simultaneously from the operating stand of the leading unit. An auxiliary reservoir is provided on the trailing unit. The main reservoir and compressor being located on the leading half of the machine. The hand brakes may be operated upon either unit when these are disconnected for independent operation.

The controller for the tandem is of the individual magnetic blow-out type, and controls all four motors simultaneously. When the tandem is split the four-motor

COMPLETE UNIT COUPLED TO A TRIP

controller operates the two motors of its unit without change in connections, while the other unit has its own two-motor controller.

The Miners' Circulars

BY CHARLTON DIXON*

For some time, the Federal Bureau of Mines has published a number of "Miners' Circulars," relating to the several subjects of mining coal, and which are of particular importance to the miner. The circulars contain many valuable suggestions in relation to the use of safety lamps, explosives, the fighting of mine fires and avoiding accidents due to electricity in mines.

One is impressed with the fact that these circulars only accomplish a fraction of the good of which they are capable. The truth of this statement will be evident when one reflects that practically not more than one-third of the miners employed in coal mines today understand and read the English language. The general opinion among mine officials is that the foreign element among miners, forming as it does about two-thirds of all those employed in the mine, is the greatest element of danger with which we have to contend. Conceding this to be the case (and few will deny it), one is led to ask why these publications of the Bureau are not translated into the foreign tongues, so that this class of labor may derive the benefit intended, in common with English-speaking miners. This is not due *them* only, but *all* whose lives are endangered by the ignorance of this class of labor.

The Bureau is maintained by the U. S. Government at a considerable expense, for the purpose of promoting safety in the mines, by devising ways and means of making miners individually more careful of themselves. Then, why, after this expense, should these circulars be permitted to drop "stillborn" from the press, as far as the foreigner is concerned.

I believe one is safe in saying that of the English-speaking miners, not more than 5 per cent. have the privilege of seeing and reading these papers, which are intended to benefit them. The employment of foreign labor seems almost a foregone conclusion, in respect to coal mining. For this reason, if for no other, every effort should be made by those who benefit by this labor, to extend to that class the same privileges and protection enjoyed by the English-speaking miners in every mining state.

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Strip-Pit Mining in Kansas

By Barry E. Scobee*

SYNOPSIS—The field is 35 miles in length and the coal averages about 3 ft. in thickness. Mining costs vary from 80c. to $1 a ton, according to the thickness of overlying cover. The coal sells for about $1.30 a ton at the mine.

The coal-stripping or opencut system of mining in the bituminous field of southeastern Kansas, is entering on its fourth year, and many of the operators of the 25 steam shovels declare that it is so unprofitable they would sell for less than the amount of money invested. However, in the pits where the virgin coal was bought advantageously, there is a steady profit and the more successful companies say that all pits could be profitably operated if the managers would employ an efficiency engineer to find and stop the hundred and one sources of loss.

The entire stripping business in Kansas cannot be commented on in a general way, as to cost of production, because this varies in direct proportion to the amount of dirt covering the seam. Some pits have a covering of only 9 ft. in places; others, 30 ft. The cost of a steam shovel moving a cubic yard of dirt runs from 2 to 5c., and possibly 6c. in rare instances. However, the expense of oil, steel cables, labor and repairs is more uniform.

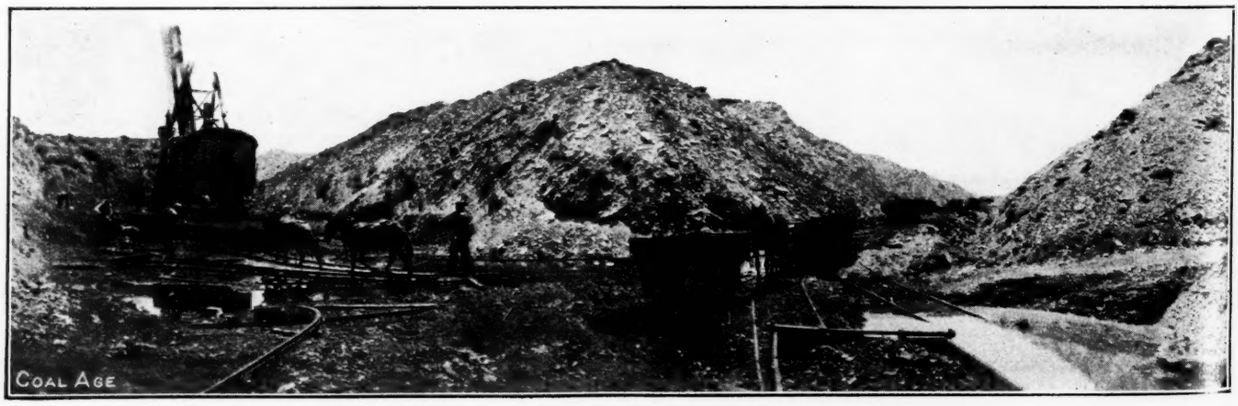
The pits represent an investment of from $40,000 to $60,000 before a yard of earth is turned. This, of course, includes the cost of the land if it is bought outright. In some instances the coal is mined on a royalty basis, in which case the original investment to the operator is reduced to the cost of the steam shovel and the labor in getting it started. The shovels in this district cost, according to size, from $18,000 to $30,000.

The "Daddy" of All the Pits

The "daddy" of the strip pits in Kansas is the Miller-Durkee Coal Co.'s operation, 12 miles south of Pittsburg. The shovel here was started April 1, 1910, and now has mining costs reduced to a minimum and standardized more perfectly than the pits which have been opened more recently.

In the 3½ years that this pit has been open, actual mining has been carried on only about two-thirds of the time, and during that period, which approximately is 26 months, the one shovel, a No. 3 Vulcan, has uncovered 40 acres of coal. At first the covering was 46 ft. thick, now it is 20, and before the 80 acres which the company owned at the start is mined over, the covering will be 24 ft. in thickness. This depth also is the limit of the shovel.

Miller-Durkee Pit, Looking 1000 Ft. Up the Cut to Steam Shovel



A Closer View of Above Pit, Showing Steam Shovel and Tram Cars

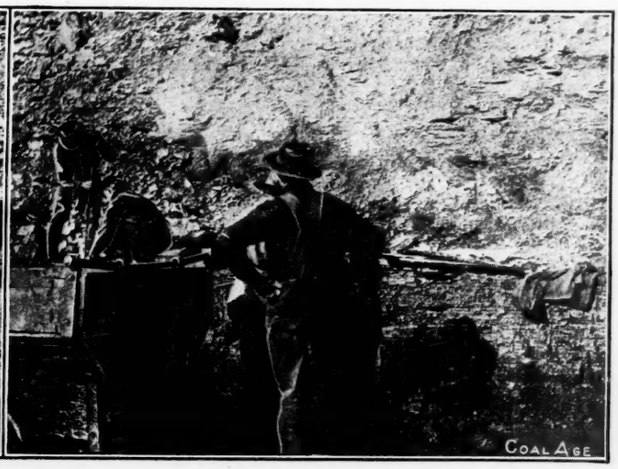
Most of the coal is sold on contract for smelter use, from this first pit, at an average of something like $1.32 a ton, at the tipple.

The Miller-Durkee people get 5000 tons of coal from a "pit," which is one furrow of the shovel across their holding, measuring about 50 ft. wide and 1400 ft. long.

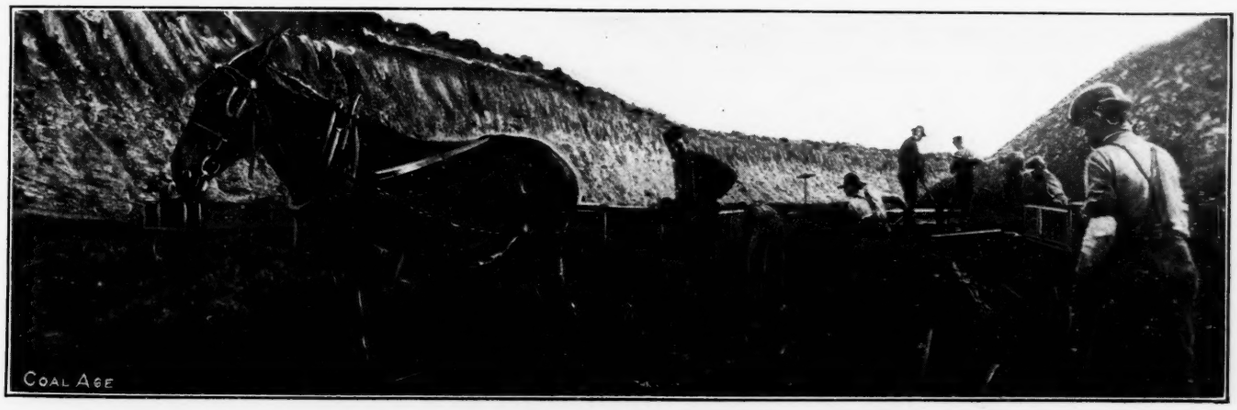
*Pittsburg, Kan.

SHOWING BROKEN GROUND LEFT BY STEAM SHOVELS

A NEAR VIEW OF THE "STRIP-PITTERS"



MINERS LOADING COAL INTO CAR



MULE HAULAGE IS THE SOLE MEANS OF GETTING THE COAL OUT

It would be more than this, but the pit contains a rock fault of considerable measurement. This means that each pit contains about one and two-thirds acres. If it were clear of fault an acre of coal 3 ft. thick would produce 4840 tons.

A pit therefore nets the company, figuring the average price per ton for contract smelter coal in the district at $1.32, the sum of $6600. Any operator in the district practically will assert that operating costs eat up most of this. A pit working smoothly takes out 350 tons of coal a day.

Some coal is stripped with teams and scrapers. Ed. Evans, of Cherokee County, is the man most extensively engaged in this style of mining and he says that sometimes the uncovering of coal has cost him as much as 15c. a cubic yard.

SOME DETAILED COSTS

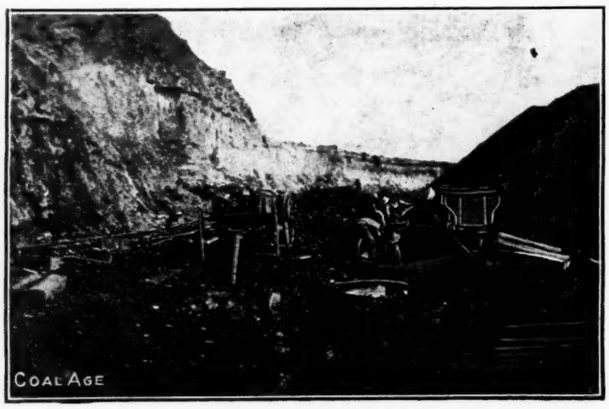
Keeping the machines oiled costs $1.50 per day, and cable costs $4 a day. It is claimed that this work is especially hard on steel cable. It wears through at the blocks and few operators will bother to mend the rope, as mending takes a long time and is more than likely to prove unsatisfactory. Most splices will not hold long.

Another cost is the frequent relaying of track caused by the necessity of having it follow the pit in the rear

DRILLING HOLE PREPARATORY TO SHOOTING

of the shovel. The crew works up quite close to the shovel. This moving of track is avoided in those pits where a crane, which sits on the bank, is used to lift the skips of coal out and place them on the trucks of trams, to be hauled to the tipple.

The stripping field extends from near Columbus, Cherokee County, to north of Mulberry, in Crawford County, a distance of 35 miles. At no place are the pits more than six miles from the Missouri line. The workings which were opened first are at the extreme edge of the south end; the ones being opened now are in the



ANOTHER VIEW OF A STRIP-PIT MINE

extreme north end. The coal does not average 3 ft. in thickness all over the field, but comes close to this mark.

Following is one stripping company's report to State Mine Inspector Francis Keegan, of Pittsburg. It covers a period from March 6 to June 30, 1913, or from the day it began loading coal for shipment, after getting started, to the time Mr. Keegan called for the report.

A No. 3 Bucyrus shovel, model 175-B, was used. The dipper handle is 49 ft. long and the boom, 75 ft. The shovel capacity is 3½ cubic yards.

The overburden was 27 ft. thick, and from 500 to 1800 cu.yd. of this was removed each day. The average thickness of the coal was 36 in. A total of 1902 tons of nut and slack coal were mined; and 6288 tons of mine run, making a total output of 8190 tons. To do this 45 men worked 47 days. There are 800 men employed in the pits of the district.

The wage scale is as follows, in part: Coal shovelers, drivers, track-layers get $2.62; coal and dirt drillers and shooters, $2.75; ground men and machine attendants, $2.40; blacksmiths, $3.05 to $3.34. The lowest paid is $1.95 to boys for greasing machinery and carrying water. This pay is for an 8-hr. day.

Mine Inspector Keegan is of the opinion that some of the pits are failures as money makers, but believes that most of them would be profitable if innumerable leaks were stopped.

A few of the pits have been in operation long enough for costs of producing a ton of coal to be deduced. These costs average from 80c. to 90c. In those pits which are claimed to be losing propositions the costs sometimes climb toward a dollar a ton.

One of the sources of loss that makes the figuring of costs difficult is the idleness of equipment caused by bad weather, or pits with water in them from rains or melting snows. Another cause of loss is due to the frequent breakdowns of machinery.

A New Coal Crusher and Sampler

Those who have prepared coal samples for analysis know that the task is, in many respects, a difficult one. Not only must the sample be taken with care, but its preparation requires no small degree of skill.

The Sturtevant Mill Co., of Boston, Mass., has recently placed upon the market a coal crusher and sampler, which should be of considerable service to those who have fuel analyses to make. This machine not only grinds the coal to a coarse powder, but automatically separates out a certain definite portion. Slate, bone, sulphur and other impurities are reduced to the exact size of the coal, and the sample thus obtained is a truly representative one.

The machine, which is massive and compact in construction, operates at comparatively low speed, and consequently is not only durable, but free from vibration. The casing is of the "open-door" type, making the grinding elements immediately accessible for inspection or cleaning.

The marketing of fuel upon a heat-content basis is steadily growing in favor. Not only are government contracts being let upon B.t.u. specifications, but many industrial concerns are following this method as well. Many firms, also, whose product goes to coke ovens are finding it decidedly to to their advantage to have daily analyses made of the output of their mines. A device, therefore, which not only decreases laboratory expenses, but gives accurate and dependable results, should be found useful at all collieries where chemical tests are conducted.

COMING SOCIETY MEETINGS

The Coal Mining Institute of America will hold its winter meeting at the Fort Pitt Hotel, Pittsburgh, Penn., Dec. 4 and 5. C. L. Fay, Wilkes-Barre, Penn., is secretary.

The Rocky Mountain Coal Mining Institute has decided to postpone indefinitely the November meeting, which was booked for Dener. This decision is due to the serious strike situation which now exists in Colorado. F. W. Whiteside, Denver, Colo., is secretary.

Mining Low Seams of Anthracite

By Hugh Archbald*

SYNOPSIS—A discussion of the methods and difficulties of working thin seams of anthracite, with particular reference to the adaptability of machines. It is the general impression that hard coal cannot be successfully mined with machines. Some remarks on longwall practice in the anthracite regions are also made.

A few years ago a seam of anthracite coal 30 in. in thickness would have been disregarded in making any estimate of the possible tonnage which could be obtained from a colliery. In a suit decided in 1899, where the proper prosecution of a lease on a certain tract was involved, it was held from the evidence produced that such a seam was unminable. Nowadays, however, a large amount of coal is obtained from small seams from 2 to 3 ft. in thickness.

This is especially true in the Lackawanna Valley, where the thicker seams have been almost exhausted as far as first mining goes. The Mine-Cave Commission, appointed by the governor of Pennsylvania to investigate the caving of the surface in the anthracite region, reported that there is only sufficient coal left under the city of Scranton to last 20 years at the present rate of mining; the same commission reports that there is enough coal in the Schuylkill region to last four hundred years. It can, therefore, be seen that there is not, at the present time in the Schuylkill region, the necessity for mining the smaller seams that exists in the Lackawanna district, where the mining of low coal is the general practice, the price of anthracite being such that this can be done at a profit.

One distinct difference between these regions, is the position of the seams. Throughout the Lackawanna Valley the seams lie almost flat, so that there is little pitch mining and practically none on any heavy pitch, whereas in the Schuylkill region, most of the mining is done on the pitch, flat seams being the exception. Pitch mining has the advantage over horizontal in the fact that the miner can stand up when boring a hole for blasting and also that he is not compelled to do any shoveling.

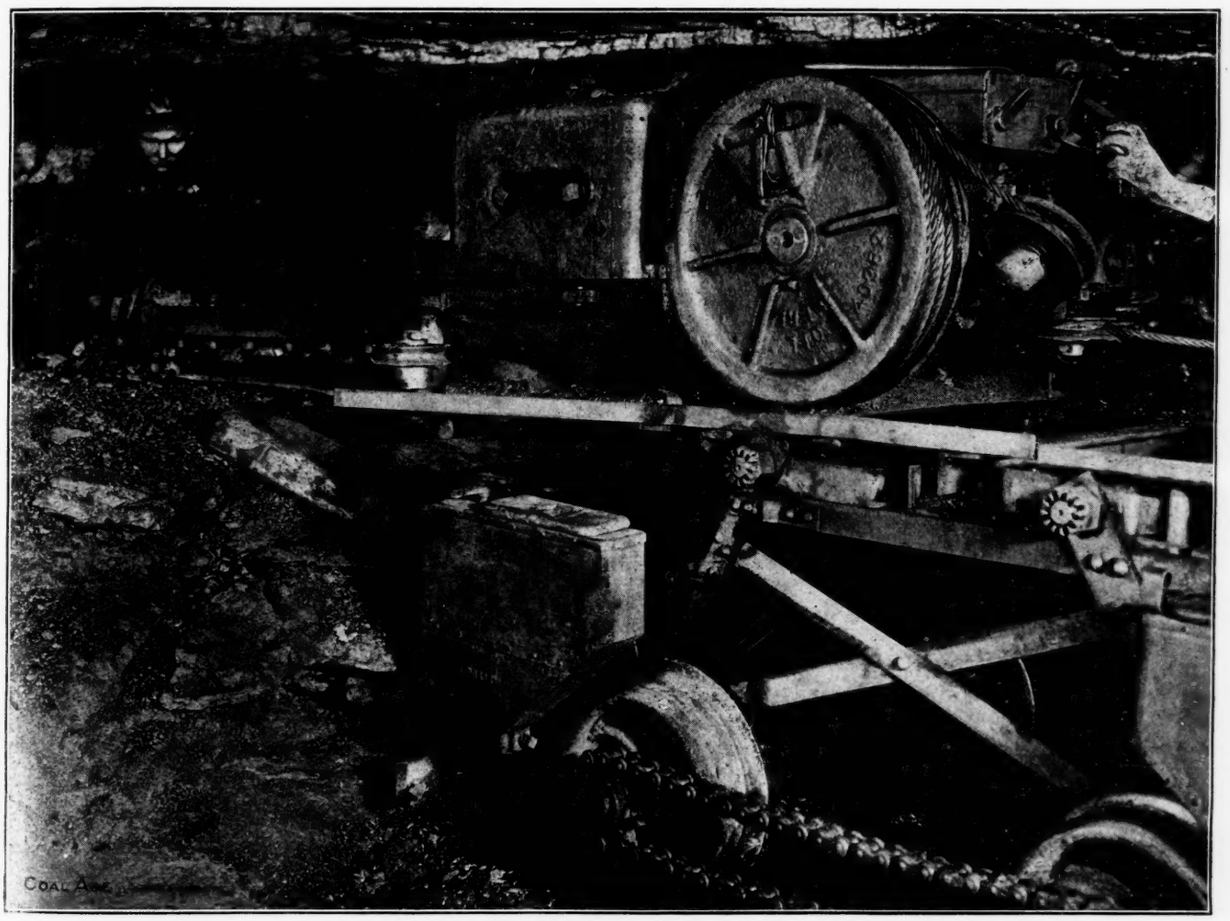


Fig. 1. Goodman Cutting Machine Being Loaded onto a High Truck

Early Method of Working Subjacent Seams

In this region the first mining was done on the room-and-pillar method, and it has not been customary to

*Cresson, Penn.

draw the pillars until the whole seam has been worked out. As a result there are large areas with pillars still standing from which coal will be obtained for a number of years to come. As there are a number of overlying seams, the leaving of pillars in one seam has necessitated the leaving of those in the seams beneath, in order not to break them by any movement of the subjacent strata.

It has not always been realized, though, that the coal would ultimately be won from the pillars, this being especially true in the early days when the best seams were being mined. At that time no care was taken to drive the rooms with any regularity or to leave strong pillars, a seam being considered worked out as soon as there was no more room for chambers. The result has been that the small pillars left standing have weakened from air chipping, and squeezes have occurred over large areas, affecting all the seams above. This has meant, in some places, the loss of as much coal as is contained in the small seams which are now being mined.

The method employed in mining the thin seams has generally been the room-and-pillar system, as they underlie other seams from which the pillars have not yet been withdrawn. The exception to this rule occurs in those cases where the small seam happens to be uppermost; when this is the case, the coal is mined on the longwall system, either by maintaining roads at chamber intervals, blasting down the top rock or taking up the bottom in order to give height for the passage of the mine cars; or sometimes the panel longwall system is used with conveyors for loading the mine cars and a face from 200 to 250 ft. long. In this latter case, the coal is first undercut by machines and then loaded into the conveyor by hand.

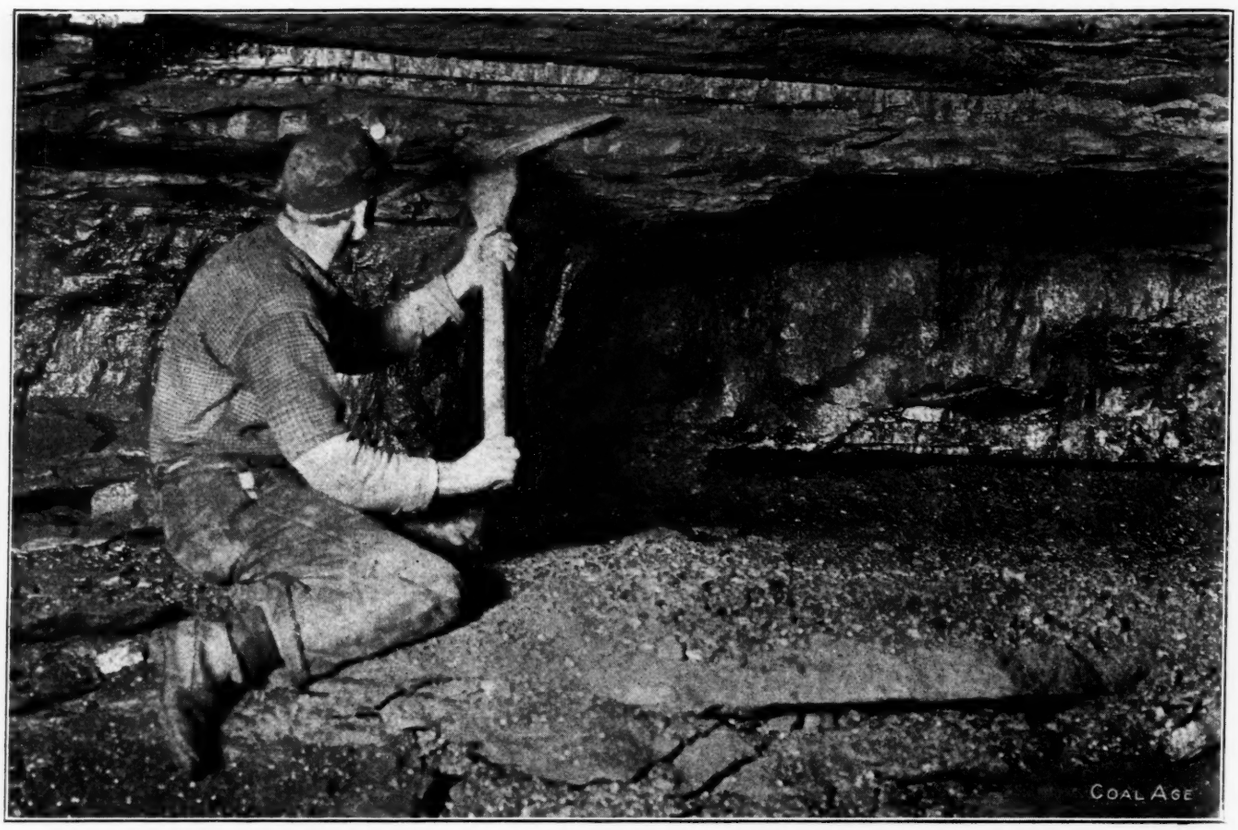


FIG. 2. CUTTING IN A THIN SEAM AT THE CAYUGA MINE OF THE D., L. & W. R.R. CO.

MINING MACHINES IN LOW SEAMS

The use of undercutting machines in the anthracite mines has not become at all general, there being less than one hundred in the Lackawanna Valley at the present time. But a few have been in use long enough to demonstrate that they are as advantageous in mining anthracite as bituminous. The universal practice is shooting off the solid. It is to be expected, now that only the small and hard seams are left, that mining machines should come into more general use.

In mining some of the 30-in. seams of coal, it has been found that as much as 50 per cent. of the coal was broken into the smaller or steam sizes. As a higher price is obtained for the larger or domestic sizes, this is, of course, a great loss. An advantage in the use of undercutting machines is the increase in the amount of large sizes secured. The cuttings from a machine are merchantable sizes, being mostly pea coal and No. 1 buckwheat, with some chestnut mixed in.

MACHINE MINING OF ANTHRACITE COAL

The generally accepted idea that anthracite coal is too hard for the successful operation of undercutting machines is wrong. They have been used to an advantage in places where the coal was so hard that a miner could only blast three and four cars with a keg of powder. Where the coal is as hard as this, a machine cannot cut much more than three places a day, but the cost of mining is reduced when a machine cuts between two and three places per shift. Nor is this confined entirely to low seams of hard coal, but has been a success in five feet and more.

In a hard seam there is greater loss from coal being blown into the gob than where it blasts easily, though even in free blowing coal there is some loss from this cause. This is due to the fact that a greater amount of powder has to be used and the lack of care in the arrangement of the gob. When the waste is piled up in neat order with walls, the coal scattered by the blast will fall on clear spaces where it can be easily recovered, but this is not the case when the flying pieces fall on the rough surface of the gob.

Roof Brushing vs. the "Buggy"

One of the large items of expense in mining low coal is the rock blasting. Where not more than two feet to two feet and a half of bottom or top has to be removed to give height, it is easier and cheaper to blast this and carry the track to the face. But where a large amount of rock has to be moved, it is more economical to employ a small car, or "buggy," into which the coal is first loaded and then unloaded into the mine car at the mouth of the chamber. The "buggy" is handled by the miner and his laborer, though sometimes a mule and a rope are used to draw it back and forth.

The "buggy" stands low, somewhat less than the height of the seam, so that it can run on a track placed in the chamber, and will hold usually about half a mine car of coal. The cars which are used in the Lackawanna region have a capacity of from two to three tons of coal. Frequently the high standing car, which was well adapted to the large seams of former days, has been still employed in the smaller ones now being mined, necessitating the cutting of a large amount of rock to give height. Along main roads it is well to maintain sufficient height, so that a man can stand upright, but this is not as essential in the chambers, where the greater part of the rock cutting is done.

System of Mining with the "Buggy"

In places where a "buggy" is used to load out the coal, enough bottom rock is taken up at the mouth of a chamber so that a switch may be laid in. The cut is made deep enough so that the mine car stands below the buggy in order to facilitate the loading. The chambers are driven in this case about 200 ft. long. Where undercutting machines are used, they are fitted with a special truck about 33 in. high, in order that the machine may be loaded and unloaded onto the bottom rock in the chamber. The height of the undercutting machine is 24 in., so that with one of these high trucks, a clearance of 57 in. above the rail must be maintained along the gangways. This is no more than is usually kept for the loaded car and its topping.

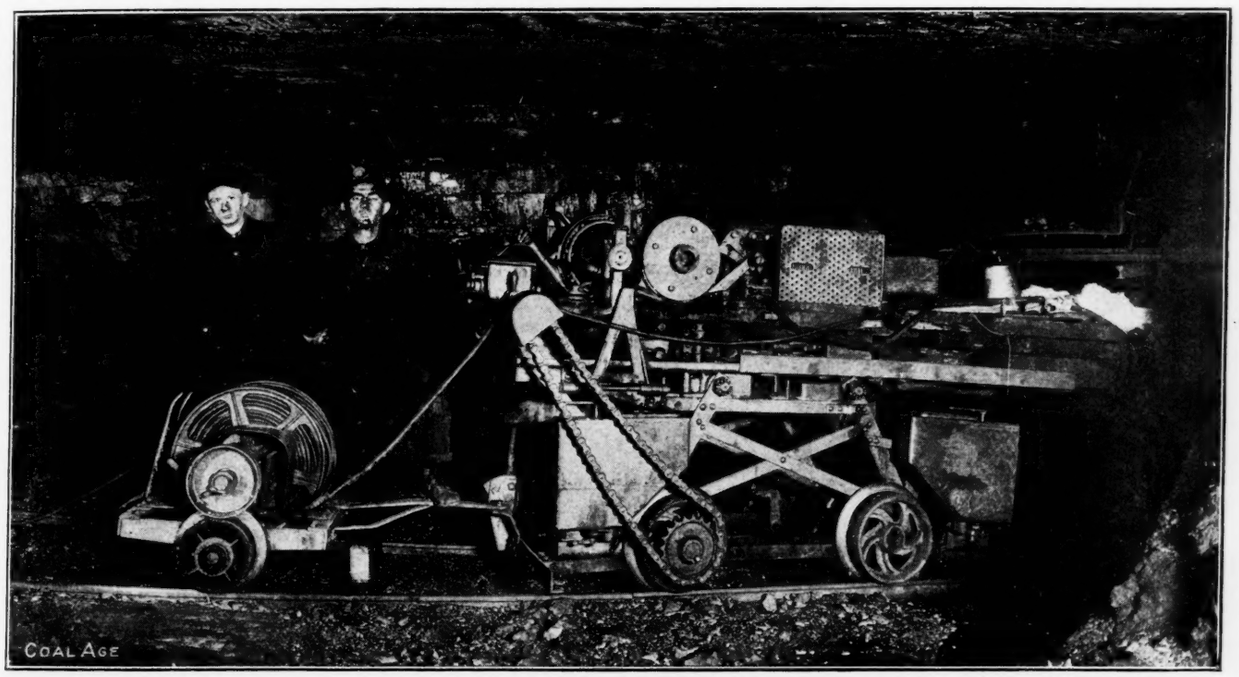


Fig. 3. Complete View of Machine Equipped with a High Truck

In Fig. 1 is shown a Goodman machine in use at the Cayuga mine of the D., L. & W. R.R. Co., being loaded onto a high truck after having made a cut; Fig. 2 shows the seam and the undercut which the machine has made. In this case the coal is from 30 to 36 in. high and above that is about 8 in. of bone. About 3½ ft. of bottom rock is taken up here. In Fig. 3 is shown another view of the undercutting machine shown in Fig. 1; this view shows the chain connections by which the machine is moved under its own power, and also the cable reel, which works automatically. The "buggy" can also be seen at the right-hand side, standing above the end of the machine; this gives an idea of the amount of rock that is taken up at the mouth of a chamber, it being quite thick but not covering a great area.

The chambers are driven about 200 to 250 ft. long and from 24 to 30 ft. wide, according to the conditions of the roof. Any greater depth than this consumes too much time and labor in the movement of the buggy back and forth.

Longwall Machine Mining

In one mine, where exceptionally strong roof occurs, the scheme has been tried of driving two narrow places to the full depth by means of a buggy, leaving a small pillar eight or ten feet wide between them. When they have been finished, an undercutting machine is used along the rib on opposite sides of each of the places, thus allowing the machine to make one long undercut before moving to another place. The real mining of most of the coal is then done by widening a narrow place. Loaders follow up the undercut, loading out the coal by means of a "buggy." The narrow places are driven in pairs and a strong pillar is left between each pair of chambers.

By the use of a "buggy" a saving in the cost of mining is obtained on account of the reduction in the amount of rock handled. There is not always room, in small seams, to stow the rock on the side of the chamber, so a great deal must be packed in other portions of the mine. Another advantage in the use of a "buggy" is the continuity of the work on coal, as the miner is not employed every so often in blasting rock.

In a certain panel longwall system in use at some places, gangways and airways are turned off from a main road at 500-ft. intervals. As soon as the gangway has advanced far enough to provide a strong pillar along the main road, two places are driven in to a depth of 225 ft. Allowing 50 ft. for the gangway and airway and the pillar between them, this will make the depth of the place equal to half the distance between the roads. After the places are driven in, a conveyor and an undercutting machine are installed. The undercut is made parallel to the main road and in the beginning it is made along the rib of the narrow place. One-half of the block of coal is mined advancing and the other half retreating.

The undercutting of the coal is done at night, the face being about the length that a machine can undercut in an average of nine hours. The conveyor is moved forward also at night, and is kept as close to the face as possible and still allow room for the movement of machine and men. The coal is loaded into the conveyor by hand during the day. A 30-in. seam will produce about 150 tons from an undercut 6 ft. deep, which is about as much as can be conveniently loaded in one shift in the cramped quarters of such a seam. An advantage which the use of the conveyor and the panel longwall system has, is the concentration of the work. Moreover there is the least maintenance of roads and branches.

Aerial Ropeway at English Colliery

Among the more interesting equipments recently installed in British Collieries is an aërial ropeway at the Bayton Colliery in Shropshire. It is interesting as being the first case in which the makers have adopted a positive rope saddle for a single-cable ropeway. In this case one rope both supports and hauls the carriers. The ropeway is 7030 ft. long and has been built to carry coal from the screens at the colliery, delivering it to railroad cars on the colliery siding close to the Cleobury Mortimer Station. At the colliery end of the line there is a main coal bunker, which has four sections for storing different sizes of coal, the classification of the coal being done by a shaking screen located over the bunker. The ropeway buckets are loaded by gravity, there being eight loading chutes, so that all four classes of coal can be loaded, if necessary, at the same time, and carried to different railroad cars at the siding.

At an angle station, situated about the middle of the ropeway, the rope makes a turn of 104½ deg., and ar-

View of Standard, Bayton Ropeway

rangements have been made so that coal can be discharged at this point. The ropeway passes over two main roads between the colliery and the siding, but it has not been considered necessary to provide safety bridges at these points, reliance being placed on the grip of the rope saddles.

The standards are built of steel sections and vary in height from 25 to 50 ft., according to the varying contour of the ground. Four steel sheaves are used to support the loaded rope and two similar sheaves for the no-load rope on the return side of the standards. They are bushed with phosphor-bronze and mounted on balancing arms, so as to divide the stress equally between them. The spindles on which they are carried, have a hole drilled through the middle and a Stauffer lubricator fixed at the end, which can be filled with grease or have the

Discharging and Return Terminal

caps tightened, while the ropeway is working. The discharge terminal is 76 ft. long and allows the simultaneous loading of three railroad cars without their being shifted, as it has a shunt rail onto which the carriers run to the required position for loading the cars. It also

contains apparatus that automatically and continuously maintains the working tension on the ropes. A telephone line connects the loading and discharging terminals and also the angle station.

The Discharge of the Buckets

The buckets on reaching the discharging position are tipped into chutes, provided with anti-breakage shutters, to lessen the degradation of the coal as much as possible. As they leave the rope to pass onto the shunt rail at the terminal, their weight is taken by the inner wheels and the position of the grip is such that its movable jaws are able to easily clear the rope. The actual amount of this clearance is about ¾ of the diameter of the rope, leaving plenty of play in reserve for the time that the carrier leaves the shunt rail to run onto the rope.

When the movable jaws of the gripper have closed onto the rope, the whole of that clamp is clear of the under side of the latter, allowing it to easily pass over the supporting sheaves without fouling them. It is stated that this form of gripper is not affected by frost or snow or even by an excess of lubricant on the rope and that loads can readily be taken up a gradient of 1 in 1½ or even 1 in 1. Another advantage of this gripper is that buckets can be carried around the return terminal without being stopped or detached from the rope or handled in any way. This is unusual in single-rope systems.

The installation is designed to carry 39 short tons of coal an hour, but this capacity could be increased by adding further buckets. Special carriers are provided for bringing up pit props and other materials from the railway to the colliery.

German Methods of Allaying Stone Dust

Some notes on recent Prussian practice in allaying the dust resulting from the drilling of boreholes are contained in the "Zeitschrift für das Berg- Hütten- und Salinenwesen," Vol. 61, No. 1. The increasing amount of rock work in coal mining and especially the development of machine drilling makes this provision of no little interest.

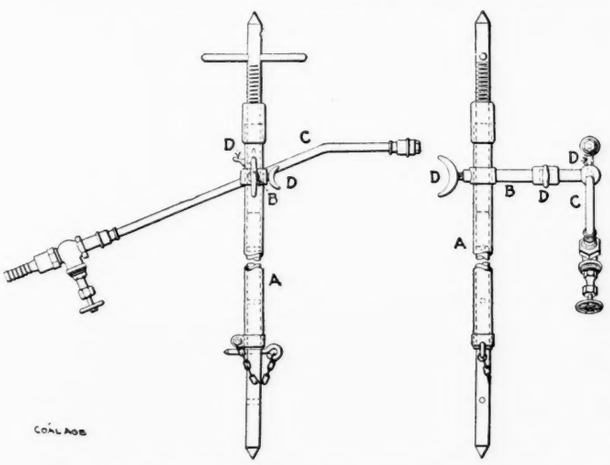


Fig 1. Apparatus for Allaying Drill Dust

At the Richter shafts of the Laurahütte coal mine in the North Kattowitz district, a water jet is used to remove drill dust from holes bored in the rock by compressed-air hammer drills. Wrought-iron gas pipes about 0.4 in. in diameter and 4 ft. long are connected by hose with the water piping and introduced into the hole during the work of the drill so that the water continuously removes the drill dust.

At the Monopol mine in the Dortmund I mining district, a water-jet device has been used with excellent success to render the stone dust of machine drills harmless. This is shown in Fig. 1. It is comprised of a mounting column *A*, similar to a drill post, which extends from floor to roof in the middle of the roadway. Upon it one or more movable brackets *B* are affixed according to the number of holes to be drilled simultaneously. On the ends of these arms are carried sprinkling pipes *C*, which can be revolved and moved longitudinally. They are equipped at the front ends with brass or bronze nozzles, while the rear ends which are provided with valves are connected with the water-supply piping by rubber hose. The valve of each pipe is so adjusted that a fine stream of water flows from the nozzle. The jet of water is arranged to strike exactly in the drill hole and is clamped in this position by the winged screw *D*. Experience has shown that a water jet about 0.04 in. thick suffices to moisten the waste from a hole so as to prevent the formation of a cloud of dust. Since the workmen are not annoyed by so small a quantity of water and as the apparatus is easily and quickly manipulated, they are willing to use it.

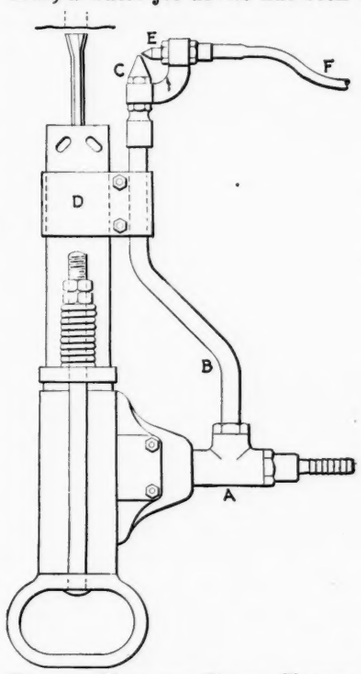


Fig. 2. Hammer Drill Fitted with a Water Jet

To obtain a similar end an appliance is being used in the Schlägel und Eisen I-II mine in the East Recklinghausen mining district. This is patented by Herr Voss and called a "dust destroyer." It is manufactured by the Glückauf Drill Factory, in Gelsenkirchen, Germany. As shown in Fig. 2, the apparatus consists of the small tube *B* connected with the T-piece *A* and the collar *D* on the hammer drill. This little tube ends in a nozzle *C*. Perpendicular to this is another nozzle *E* connected with a hose *F*. When drilling, this is hung in a water tank. The T-piece *A* is connected with the compressed-air piping so that a part of the air flows through the little tube *B* and the nozzle *C* and sucks a supply of water through the nozzle *E* and the water hose *F*. This is finely sprayed around the drill hole thus continuously allaying the stone dust as it forms in drilling.

Since the fixture is fast connected with the hand-hammer drill, the workmen are compelled to make use of it.

POWER DEPARTMENT

The Utilization of Exhaust Steam

SYNOPSIS—In using low-pressure steam from hoisting engines, some kind of accumulator is necessary. A device is here described which is flexible in that it accommodates itself, within limits, to a varying supply of exhaust steam.

In many collieries the problem of the efficient utilization of the exhaust steam from the hoisting engines, making a large intermittent demand on the boiler capacity, is a perplexing one. Even when run condensing these machines do not utilize the full heat value of the steam. Attempts have been made to secure further thermal efficiency by passing the exhaust through turbines on its way to the condenser.

Providing that the condensing arrangements are effective and the vacuum maintained is high, it has been proved in practice that a considerable increment of power can be thus obtained. This is generally utilized in driving electric dynamos, from which auxiliary machinery can be economically run.

Much trouble has, however, occurred in the past, owing to the fact that the power demand of the hoisting engines is intermittent and hence the supply from the exhaust may vary in a ratio of as much as five to one, comparing the maximum with the mean output.

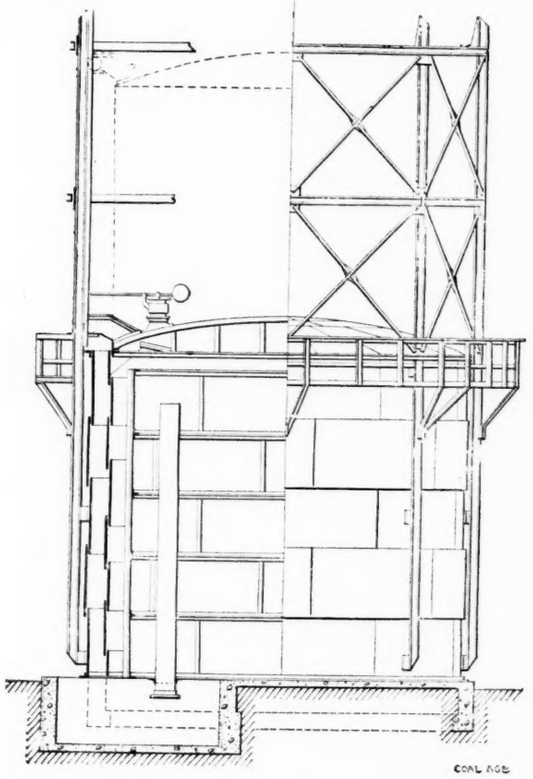
This obviously imposes a considerable difficulty in the proper use of exhaust steam from this source, because in order to utilize the whole amount, a low-pressure plant of sufficient capacity to deal with the maximum output, would have to be provided, which for considerable periods would operate at but a small proportion of its rated output. Where electrical power is obtained in this way, some form of electrical storage could be adopted in order to equalize supply and demand, but the expense of equipping and maintaining a storage battery becomes a serious factor in the adoption of such a scheme.

Steam Storage Is Advantageous

It is evident therefore that suitable storage, located between the main engine and the exhaust-steam equipment, would have many advantages, and numerous attempts have been made in this direction. In many situations compactness and simplicity are essential features in connection with exhaust-steam accumulators, and one of the successful types which has been adopted in practice is that illustrated herewith. It is made by Messrs. Louis Schwarz & Co., of London.

The exhaust steam leaving the primary engine in a fluctuating manner is collected in an inverted bell accumulator, similar to a gas holder, without regeneration. An intermittent supply is thus changed into a continuous stream passing at an even tension to the low-pressure machine. The simplicity of construction and reliability in operation make it a simple and easy means of surmounting the difficulty outlined above.

The accumulator consists of a riveted wrought-iron or mild-steel bell, contained in a structural-steel framework, and so arranged that it is freely movable in a vertical direction. The pressure of the steam thus remains constant irrespective of the variation of the volume of the space between the bell and the stationary floor of the accumulator.



Half Section of Receiver

The bell dips at its lower end into a water seal and an easy upward and downward movement is obtained without tilting or jamming by means of suitable guides and guide wheels or similar devices in exactly the same way as the gas holder is constructed. On the inside of the bell internal ribs and girders are provided to resist pressure.

The bell is constructed of an ample capacity in relation to the output of the primary engine in order to give a storage proportionate to the usual ratio between maximum and mean demand. There are, however, frequent occasions in practice when this ratio may be exceeded.

Overloads and Underloads

On the one hand the primary engine may operate on an overload larger than that originally intended, or for a longer period than the storage capacity of the bell was designed for. In this case there will be an excess of steam, and in order to allow its escape in the event of

the bell rising to the full extent of its travel, there is provided a suitable safety valve. This allows any surplus steam to blow off, is large enough to prevent a dangerous increase of pressure inside the accumulator, is automatically opened just before the bell reaches its top position and closes again when descent has begun.

On the other hand, the primary engine may be operated on light loads for a considerable period. In this event there will be a shortage of exhaust steam compared to the demand of the low-pressure equipment. In such cases it is necessary to admit live steam to the accumulator should the ordinary supply be insufficient for the requirements of the secondary engine. This is also automatically provided for. When the bell falls to a predetermined point, shortly before its arrival at its lowest position, a valve is opened by means of a suitable mechanism arranged therefor and live steam is admitted to the accumulator.

This steam then expands to the pressure for which the bell is arranged and a further supply is automatically cut off as soon as the accumulator regains a certain height, which can also be predetermined.

In order to prevent, in case of a shutdown, the possibility of a vacuum being formed in the bell or in the pipes leading thereto, an automatic air valve is provided. The necessary drain valves and pressure gages are also suitably located.

Surface Condensation Is Reduced

In order to reduce the condensation of steam, due to surface radiation, to a minimum, a coating of heat-insulating composition is placed over the bell, so applied that there is no danger of its being displaced in working. The floor of the accumulator consists of concrete which also serves as a foundation. This is in consequence suitably thickened under the side walls and around the piping leading into the accumulator.

Between the main engine and the accumulator an oil extractor is fitted in order to eliminate the oil and impurities from the exhaust steam. This is necessary because it would be disadvantageous to allow oil to pass through the turbine into the condenser and thence to the boiler. It is also desirable that back pressure be reduced as far as possible as this lowers the initial pressure of the exhaust-steam plant. A device has been produced which accomplishes both these results admirably, the steam reaching the low-pressure apparatus being said to contain only 0.001 per cent. of oil. Moreover, the oil thus recovered can be filtered and used over again.

The accumulator above described would appear to be a valuable means of reclaiming waste power from an intermittent supply of exhaust steam. Its compactness, simplicity and reliability are strong features in its favor.

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The Norfolk & Western Electrification

The Norfolk & Western R.R. has decided to electrify that portion of its trackage lying between Bluefield and Vivian, W. Va. Including branch and feeder lines, this amounts to about 85 miles.

The carrying out of the contract which has been already let will give form to one of the most important projects of steam-railroad electrification yet undertaken. This contract calls for the manufacture and delivery of twenty-six 130-ton electric locomotives of the single phase-two phase type, together with all required powerhouse generating machinery and transmission apparatus.

Single-phase alternating current at a frequency of 25 cycles and a tension of 11,000 volts will be supplied to the locomotives through an overhead trolley wire. This is the same type of system that has long been successfully used by the New York, New Haven & Hartford R.R. on its main line, by the Boston & Maine in the Hoosac tunnel and by the Grand Trunk Ry. in the Sarnia tunnel, also by the New York, Westchester & Boston Ry.

The Norfolk & Western locomotives besides being large and of enormous hauling capacity, will embody many unique features and refinements of design, which it is expected will result in their showing unprecedented flexibility and economy of operation.

The Bluefield-Vivian section serves the Pocahontas coal field, which is one of the largest and most celebrated coal regions in the world. The coal handled amounts to 65,000 tons per day, necessitating trains weighing as high as 3250 tons. It was in order to facilitate handling this heavy traffic that electrical operation has been decided upon. There are a number of grades on this section, the maximum being 2 per cent. At the present time, three Mallet locomotives are required per train, one at the head and two pushing. Only two electric locomotives will be required for this service and the speed will be approximately doubled.

Three Speeds of Operation

Since the Norfolk & Western locomotives are intended for handling what is called tonnage trains, they will be built for running speeds of approximately 7, 14 and 26 miles per hour. The design of the electric equipment will be such that the tonnage can be readily increased in the future as the service may demand. The traffic conditions on this section of the road are especially well adapted for electrical operation. It is in reality a separate engine division at present and can therefore be operated electrically without affecting locomotive service on other sections of the line.

Power for the entire electrified section will be generated in one central station, located at Bluestone, W. Va., with an installed capacity of 27,000 kw. in turbo-generators. All of the electrical apparatus including the locomotives, will be supplied by the Westinghouse Electric & Mfg. Co.

Conditions that are conducive to high economy in an electrification like that of the Norfolk & Western, are: (1) Traffic requirements such that a minimum electrical equipment will give practically continuous service. (2) Fewer engine crews will be required per train. (3) The speed of operation over the division will be nearly double that possible with present steam equipment. (4) Increased capacity of electrified section. (5) Electric locomotives are not limited to short hours of service, on account of boiler or fire conditions, as are those propelled by steam. (6) Watering and coaling delays incident to steam operation will be entirely eliminated. (7) The general reliability of locomotive operation will be considerably improved.

As stated above, the contract for this work has already been let. This calls for its completion in the summer of 1914.

An Example of Colliery Switch Gear

Special Correspondence

SYNOPSIS—A totally inclosed switch with many features making for safety. The device has been designed and constructed in conformity with the rigorous stipulations and recommendations of the British Home Office.

The conditions imposed by the British Home Office with regard to colliery-switch gear have been made stringent. This is a step in the direction of insuring safety to employees in what is admittedly a dangerous occupation.

In the report of the Departmental Committee appointed by the Secretary of State for the Home Office to consider special rules for the use of electricity in mines, a good deal was said with regard to the switch gear in use in collieries. It was pointed out that such apparatus was not sufficiently strong mechanically to resist rough usage and that switch gear of the open type was really designed for surface work and was not suitable for underground use.

Switch gear for underground use should be dust-proof, moisture-proof, and so constructed as to prevent open sparking. The outer metal coverings should be of ample thickness with well-fitted joints and glands where cables and spindles pass through. All handles for operating the switches themselves should be safely and conveniently placed. The general design should be such that any fault or failure is under all conditions confined to the inside of the metal box or covering so as to avoid all danger and risk even to the operator himself.

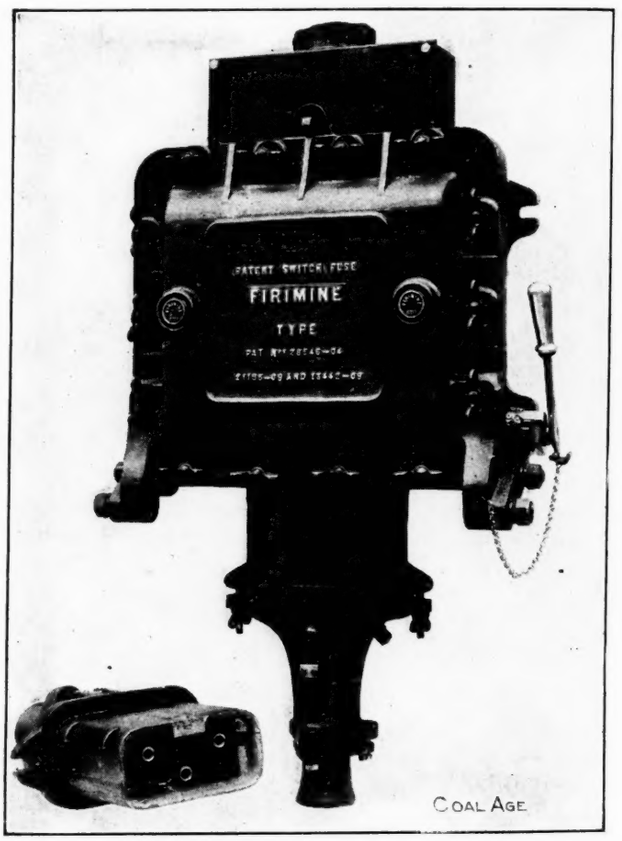
The switches should be so constructed as to reliably make and maintain all contacts, and so designed, built and adjusted that they cannot be left in partial contact or accidentally moved into such when left out of contact.

Unless the "on" and "off" positions are obvious from the position of the handle, the two extremes "on" and "off" should be clearly marked. Except in the concentric system, single-pole switches are not to be used. In choosing a switch, furthermore, regard should be paid not only to its capacity to carry the working current but also to its ability to open the circuit safely on any short-circuit with which it may be called upon to deal.

Reference has been made to the foregoing details of this report inasmuch as it has been upon these recommendations that modern British practice in switch-gear design for colliery work has been based. The accompanying illustration shows the general appearance of a fused switch constructed by Messrs. Berry, Skinner & Co., of Birmingham, England, who specialize in the design of switch gear capable of being used by unskilled attendants. It will be seen from this illustration that it is particularly substantial in its design and construction and highly suitable for use in mines. It has been actually tested with a violently explosive gaseous mixture and withstood the trial admirably. This particular test was witnessed by several expert mining engineers who commented on the switch in favorable terms.

The arrangement is entirely fool-proof, that is to say, the lid of the switch cannot be opened until the lever is first thrown to the "off" position. The plug cannot be withdrawn from the live contacts, nor can it be inserted into them. The switch has to be brought to the "off" position before this operation can be effected, and the plug is provided with a special ground connection.

Particular attention may be drawn to a good feature in the design which is the broad machine-faced jointed box which is provided with unloosable fastenings. When the plug is withdrawn all live contacts are shrouded and in this way the operator is not liable to accidentally receive a shock from exposed and live metal-work. Mica



The Switch. Note Careful and Heavy Contruction

is used as an insulating material throughout the design. The illustration shows a triple-pole combination, and owing to the compactness of the design it is claimed that for a given current capacity less internal space is required than is generally the case. The fuses are of the cartridge type and when correctly installed are guaranteed to open any short circuit with which they may be called upon to deal. They can only be replaced after the current has been automatically cut off as all fuse-carrying parts are dead when the switchbox is opened.

The apparatus is automatically locked on and off for intermediate positions, and it is impossible to tamper with the contact to any extent. As regards carrying capacity the switch fuse is designed with a generous margin of safety. Total inclosure as regards terminals, cable ends, cable joints and connections are provided and suitable bushed packing glands are used of a type approved by the factory inspector. The entire mechanism constitutes a fine example of modern British switch-gear design.

Our British Coal-Mining Letter

SYNOPSIS—Bath-houses should not involve an expenditure of over 6c. per person. Requirements for their construction and management suggested by British investigating committee. Account of the byproduct plant at Birchenwood, which produces gas, tar, ammonia, benzol, phenol, cresylic acid and pyridine. Turbine pumps for raising water, their operation, advantages and desiderata. Recommendations to machine runners. Difficulties in grounding, and the inefficiency of the earth as a conductor.

In accordance with the terms of the Coal Mines Act of 1911, where a two-thirds majority of workmen represent to the owner of a British mine that they desire facilities for taking baths and drying clothes at the mine, the owner must provide sufficient and suitable accommodation for the purpose. It is assumed the maximum cost of maintenance will not exceed 6c. per head per week.

A departmental committee has reported that the bathing accommodation should consist of spray or douche baths, each bath being contained in a cabinet so constructed as to secure privacy, and having suitable arrangements for dressing and undressing. The committee states that the number of baths should be in the proportion of one to every six persons in the largest shift employed in the mine. The building must be of sufficient dimensions, efficiently lighted and ventilated, must be constructed of non-inflammable material and have a floor of concrete or similar material so graded and drained as to allow any water to run to and be carried away at the sides of the building. It is also proposed that each person using the bath shall be provided with soap, and, at the beginning of each week, and at such other times as the person in charge may think necessary, with a clean towel for his sole use.

English Indorse the "Monte-Habits"

As regards drying accommodation, arrangements have to be made for suspending in the roof of the building the clothes of each person using the bath, by means of a chain so arranged and fitted as to be under the sole control of the person to whom it is allotted, and to keep the clothes of such persons, when suspended, entirely separate from the clothes of any other person. Efficient means must also be provided for drying clothes when so suspended. The management of the baths as suggested by the departmental committee shall be vested in a committee consisting of three persons appointed by the owners of the mine and three elected by ballot of the workmen.

Coking Plant Makes Seven Byproducts

The Birchenwood Colliery in North Staffordshire has acquired some fame by reason of its coking and byproduct-recovery plant. There are two sets of coking plants, the first being erected by Simon Carvés, Ltd., in 1909, and consisting of 84 ovens, 60 of which are of the non-regenerative, or waste-heat type, and 24 of the regenerative type, with complete byproduct plant for the extraction of tar, ammonia and benzol. Each oven takes a charge of 8 tons of slack and yields about 5.5 tons of dry coke.

The second plant was only completed last autumn; it consists of 72 Still coke ovens of the regenerative type, and in addition a complete byproduct plant for the extraction of tar, ammonia and 65 per cent. of the crude benzol, also for the manufacture of carbolic and cresylic acids and pyridine. Each oven takes a charge of 9.5 tons of slack and yields about 6.6 tons of coke, the charging and coke-discharging machines being electrically operated.

The producer-gas plant, at Birchenwood, consists of 13 Mond producers, each capable of gasifying 20 tons of fuel per 24 hours. The gas is used both for direct boiler firing and also for driving gas engines to generate electricity for general purposes. The electrical supply consists of three-phase alternating current, generated at 2500 volts, 60 cycles.

Turbine Pumps in Collieries

Features common to turbine pumps, as noted by R. H. Willis, before the East Scotland branch of the Association of Mining Electrical Engineers are: One or more impellers, mounted on a shaft, revolving in suitable chambers, each delivering the water through a diffusion vane into the succeeding impellers, and finally into an annular space, from which the water escapes into the delivery pipe. The diffusion vane takes hold of the water after it leaves the impeller at a high velocity, and guides it into suitable passages until the velocity is comparatively reduced; the kinetic energy due to the velocity being thus converted into static energy.

There is no actual displacement of water in the turbine, as in the ram pump, the action depending on the velocity imparted to the water, due to the revolving impeller, this velocity being ultimately changed into pressure head. There is, therefore, no necessity to provide relief valves on a turbine pump, as the pressure can never rise above that due to the velocity set up by the speed of the impellers.

By reason of this the pumps can be started up with the delivery valve closed, and this is a great advantage as there is no chance of accidents happening, as would be the case if this procedure were adopted with a pump of the ram type.

Desirable Points in a Turbine Pump

Mr. Willis says the following points should be considered when undertaking the installation of a turbine pumping plant: (1) The pump should be capable of being easily reërected; (2) all wearing parts should be made renewable, and all similar parts of similar pumps should be made interchangeable; (3) effective construction should be adopted to obviate end thrust. Having decided upon the type of pump, further considerations include: (a) The pump should be fixed on solid foundations and set carefully in line; (b) the suction pipe should be absolutely airtight; (c) an efficient foot-valve should be provided; (d) the pump should be placed as close as possible to the water to be lifted.

Don'ts for Machinemen

In his paper on the Installation and Manipulation of Coal Cutters, before the West of Scotland branch of the Association of Mining Electrical Engineers, J. McCann

gave some advice in the form of Don'ts, including:

Don't switch on the power too quickly; let the machine attain full speed gradually. If the load is unusually heavy, switch on the power more slowly, not faster.

Don't increase the size of the fuse just because it often "blows." It is easier to change a fuse than an armature.

Don't raise or lower the cutting level in quick steps when driving a disk or chain machine. The only machine that can be so operated is the bar cutter.

Don't force the machine through a hard cut with blunt picks. Time is saved, not lost, by changing them.

Don't neglect such trifles as a loose screw or a broken spring, because it is a small detail; either repair it or report it. "A stitch in time saves nine."

Don't bury the machine in a cut because you are working by contract. Work out your costs properly and see whether it does not pay better to cut with the crown wheel clear.

Dangers of Electricity in Mines

Before the Association of Electrical Engineers (South Wales), Chris Jones pointed out that (1) the danger from shock arises from leakage, and is more likely to arise in mine work than in other industrial applications, owing to the rough conditions under which the plant is used. (2) Fire risk is greater also and means of escape are not readily provided. (3) Risk from explosion is peculiar to colliery work; and excluding the risk peculiar to brushes on motors and to switchgear it may be due to (a) an explosion arising from leakage accompanied by arcing or sparking; (b) an explosion arising from breakdown of an individual device or cable, and accompanied by arcing or sparking.

In both these sources of danger the leak is the principal contributing cause, a leak being the passage of electricity through some path other than that provided by the conductors intended for the purpose. The best protection against the danger of shock from conducting bodies lies in properly conducting or inclosing live parts; and in efficiently grounding armored cables and substantial fittings for making good mechanical and electrical connections between the metallic cases and the armoring.

The Earth an Uncertain Conductor

The earth is a conductor of electricity, and in the past it has been so used for telegraph and telephone work. A "ground" has been legally defined as follows: "*The* ground is *a* ground, but *a* ground need not necessarily be *the* ground." Grounding the tubing or other metal sheathing of insulated electric light and power conductors is generally meant to signify that the tubing, etc., are to be grounded to the earth; that is to say, they are to be connected to the general mass of the earth. A really satisfactory ground is not easy to obtain, for the old idea that the earth is of zero resistance, because it is of practically infinite cross-section, is now recognized as erroneous.

Testing Permissible Explosives

Prof. Vivian B. Lewes, discussing the "Testing of Safety Explosives," before the Royal Society of Arts, said the only true way to test the safety of a mine explosive was to use it in coal mines during a period of many years, his opinion being that when tons of the material had been used and millions of shots fired under every condition conceivable in practice without a single accident being traceable to its legitimate use, such an explosive held a certificate of safety which no series of tests under empirical and artificial conditions could ever afford. He pointed out that testing stations had different methods of testing and he feared that satisfactory explosives would be supplanted by others so feeble in character that great difficulty would be found in insuring their complete detonation.

It seems wrong to reject years of experience gained under mine conditions and to follow other methods unless statistics show that per million tons of coal won a certain explosive in use gives rise to greater loss of life than others. The practical conditions in use are so widely different from those of the tests that the personal factor of care in use becomes of enormous value. Mr. Lewes is convinced that a reliable and careful shotfirer blessed with common sense is a greater protection than any tests, rules and regulations that can be framed. For this reason he views with suspicion anything tending to lessen personal responsibility.

Explosive Dusts Classified

Doctor Wheeler, who is the chemist to the British committee investigating the causes of explosions in coal mines, has conducted experiments with samples of carbonaceous dust collected by factory inspectors to determine (1) the degree of inflammability and (2) the capacity to transmit explosions. The dusts are divided by Doctor Wheeler into three classes: (*a*) Dusts which ignite and propagate flame readily, the source of heat required for ignition being comparatively small, such, for instance, as a lighted match. This class includes sugar dextrine, starch, cocoa, rice meal, sugar refuse, cork, unextracted soya bean, wood, flour, malt, oat husk, grain (in flour mills), corn meal, tea, compound cake, grain (in storage), rape seed, cornflour, flour (in flour mills), chicory, briquettes, gramophone record material, and extracted soya bean. (*b*) Dusts which are readily ignited, but which for the propagation of flame require a source of heat of large size and high temperature, such as an electric arc, or one of long duration, such as the flame of a bunsen burner. This class consists of copal, gum, leather, dead cork, cocoanut oil, milling rice, milling sawdust, castor oil, meal oil, cake offal, dust from the grinding of bran, grist milling, horn meal, mustard, shoddy and shellac composition. (*c*) Dusts which do not appear to be capable of propagating flame under any conditions likely to obtain in a factory either (1) because they do not readily form a cloud in the air, or (2) because they are contaminated with a large quantity of incombustible matter, or (3) because the material of which they are composed does not burn rapidly enough. This class consists of organic ammonia, tobacco, spice millings, drug grindings, cotton seed, soya bean, bone meal, coal, lampblack, sack cleanings, retort carbon, rape seed (Russian), blacking, brush carbon, stale coke, plumbago, bone, charcoal, and mineral and ivory black.

As a result of investigations made by the U. S. Bureau of Mines, it was estimated that a cubic foot of coal from Monongah set free, during its mining and in the first two weeks thereafter, 1.4 cu.ft. of methane. During the first 12 weeks after mining, a volume of methane is liberated equal to 1¼ times the volume of the coal. At first the gas escapes rapidly; then it gradually diminishes and stops altogether in from 8 to 18 months.

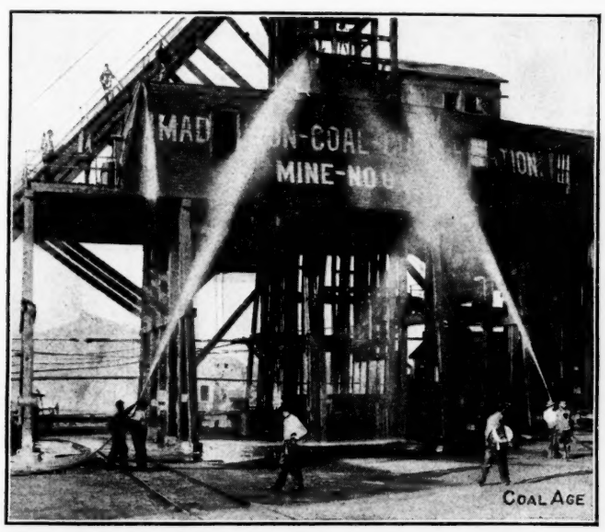
Fire Fighting by the Madison Corporation

By A. T. Shurick

SYNOPSIS—Through the courtesy of President Moorshead, of the Madison Coal Corporation, a number of mining men were afforded the opportunity of viewing a demonstration of the company's fire-fighting, rescue and first-aid work at two of its Illinois mines. The exhibition was unique in that all the conditions of an actual explosion were assumed and acted upon, including the recovery of the mine, extinguishing the fire and administering first aid. In view of the fact that the Madison people are the acknowledged leaders in Illinois, if not in the United States, the demonstration is of particular interest.

It is probable that no one unequipped with a military training could ever perfect such a fire-fighting machine as the Madison Coal Corporation boasts of. Such a task requires something more than mere executive ability. In event of an explosion or fire, the operating department is subjected to a severe test—a test under which the most efficient organizations frequently crumble to pieces.

It is clear, therefore, that the exigencies of the case



The Fire Team in Action at No. 8 Mine

must be anticipated insofar as it is possible to do so. Each man must be allotted his particular task so that all may act promptly, without waiting for orders, and the work of each unit must be performed with the precision of an automaton, for the slipping of a single cog at a critical moment may disarrange the working of the whole machine. Obviously this perfection can be attained only by such frequent drills that each man's duty becomes a matter of habit with him. Apparently the Madison Corporation, thanks to President Moorshead, has reached this millenium.

The Surface Equipment at No. 9 Mine

At the request of Manager Cartlidge, of the Illinois Mine-Rescue Station, seconded by many of the state mine inspectors, President Moorshead was prevailed upon to give a special demonstration of the company's apparatus and methods. Through the courtesy of his company a special train was arranged to convey the visitors from Carbondale to their No. 9 mine, at Cambria. This is a shaft operation somewhat over a hundred feet deep and having a capacity of 3000 tons per day. It was not working on the day of the inspection, Oct. 14.

Arriving at the mine a complete inspection of the surface plant was made, which developed a number of interesting features. One of these was a plant for manufacturing concrete blocks for the arching of the roof in

Reinforced-Concrete Run-a-Round at the No. 9 Shaft Bottom

the mine. The forms are of steel, quite simply constructed and economical. There is also an unusually efficient Jeffery fan installation kept up in remarkably excellent shape; it is equipped with a pressure-recording apparatus and under test showed 290,000 cu.ft. of air per minute with a 6-in. water-gage. Insufficient boiler capacity at the time of the test made it impossible to bring the fan up to full speed.

The rescue station, shown on page 588, of last week's issue, was of particular interest. It is a substantial brick building having rooms for smoke testing, washing and dressing, helmets and oxygen tanks. Another unique

feature was the automatic gates at the shaft top. These are controlled entirely by the hoisting engineer and cannot be opened when the cage is in motion; also, should it be attempted to open them when the cage is not at the landing a gong sounds a warning in the engine room.

This device, together with an arrangement for belling the engineer from the cage, when same is in motion, were invented by A. J. Gurney, master electrician of the Madison Coal Corporation. Patents are now being taken out and we hope shortly to publish detailed descriptions of these inventions.

Fire Drill on the Surface

When the inspection of the surface plant had been completed the fire alarm was sounded. It seems difficult to pay a sufficiently high tribute to the excellence of the fire drill. In one minute and thirty seconds by the watch a strong covering had been lowered over the shaft top*, a 2-in. stream of water was playing on each side of the head frame, and the busy little hand extinguishers were in evidence on every hand. Each man had his allotted task and he did it with an accuracy and dispatch that left little to be desired.

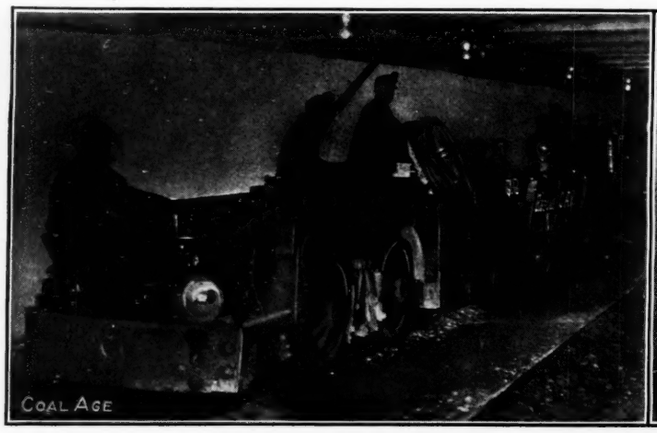
It was now explained to the visitors that the hypothetical condition of an actual mine fire and explosion had been assumed underground. Accordingly the helmet corps of five men was ordered out to make an inspection of workings and report the location of the trouble. Before going underground the men are subjected to a rigid inspection and testing of the apparatus. The smoke room in the rescue station is filled with sulphur gases and each man is required to enter, after which they are lined up, the oxygen pressure and general condition of their apparatus noted, clocks set and the name of each man recorded. All of this is done with military precision, and 18 min. after the alarm sounded the party was ready to descend. In the meantime the rescue team from No. 8 Mine, about two miles distant, had been ordered out to be on hand in case of emergency.

*It should be noted here that an underground concrete conduit leads from the side of the shaft, a few feet below the surface, off to a point well removed from danger, where it comes to the surface. Thus when the covering has been lowered over the shaft the air enters through this auxiliary air course.

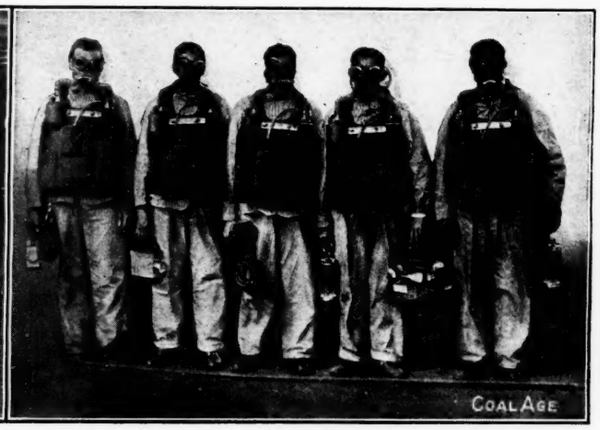
Everything being in readiness, even to the canary bird and electric hand lamps, the rescue party was lowered away. In about half an hour the foreman returned to the surface and reported the location of the trouble; also, that while they had been unable to determine the full extent of the fatalities, there were at least two men injured. The first-aid men were accordingly ordered out and entered the mine equipped with safety lamps.

Inspection of the Underground Workings

The visiting party having been equipped throughout with overalls and carbide lamps, then went below and witnessed the preparation and departure of the special rescue cars for the scene of the trouble. These cars are of particular interest and we hope to publish a detailed description of them shortly. They were illustrated in our issue of last week. On the exterior they much resemble the ordinary mine car. On each side, however, are arranged lockers which contain the first-aid appliances and serve as seats for the rescue team while riding in. Before starting the entire equipment, consisting of rubber pillows and gloves, blankets, bandages, stretchers and tools, such as wire cutters, hammers, hatchets, axes and crowbars, are thoroughly overhauled. These two cars, together with a 50-gal. revolving chemical fire extinguisher, mounted on mine-car trucks, are always standing in readiness for instant use.



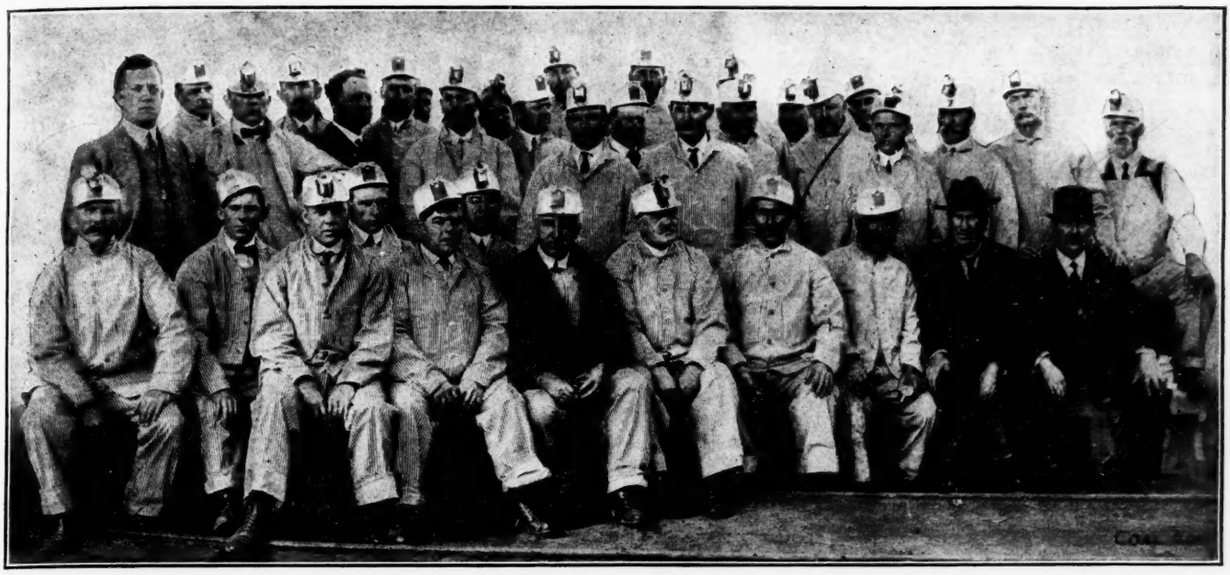
Rescue Car About to Start for the Scene of the Accident



Rescue Corps Fully Equipped and Ready to Enter the Mine

After the departure of the rescue party, the visitors made a complete inspection of the bottom, which was of interest because of the large amount of steel and concrete construction used. This was made necessary by the inadequate pillars left in the early mining. Concrete is used profusely at the immediate shaft bottom, in the run-a-round and in the pump room and sump. Steel doors only are used here and the double partings at the bottom are carried on large I-beams.

The underground hospital is also concrete lined and has a lighter section of I-beam for the roof; it is quite commodious, clean and sanitary. The underground stables proved a model of cleanliness and convenience; whitewashing is liberally applied and perforated pipes make it possible to flood the entire stable almost instantaneously. A concrete underground oil house was another feature of interest, also an electric device for drying the sand required by the mine motors.



GUESTS OF THE MADISON CORPORATION WHO VIEWED THE FIRE-FIGHTING DEMONSTRATION
President Moorshead wearing a black "jumper" is seated near center of picture in front row.

SOME SAFETY DEVICES AND AN UNDERGROUND FIRE DRILL

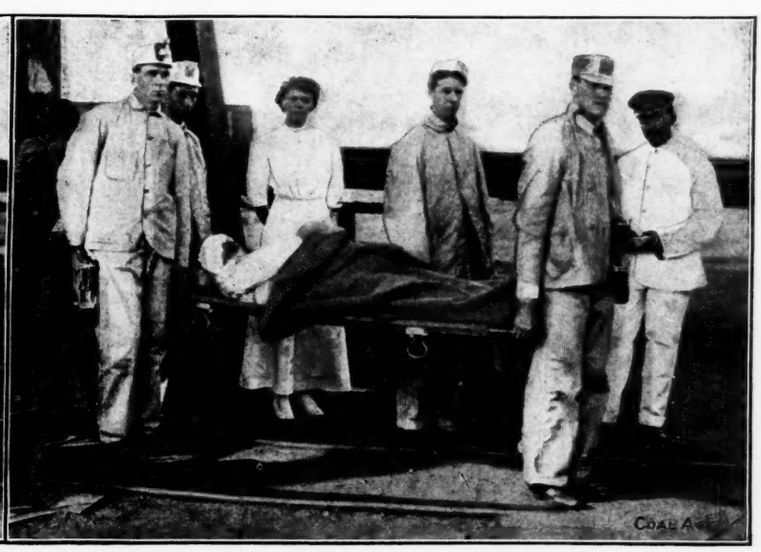
The Madison Corporation employs a unique safety arrangement that seems worthy of particular attention, because of its simplicity. This consists in whitewashing all wide places in main haulageways that are also used as traveling ways. These points stand out with remarkable distinctness in the inky blackness of the underground workings and provide a ready safety hole in which to escape a passing trip. The underground motors are also equipped with powerful searchlights and gongs. In view of the possibility of running into fall, or other trouble on the track, or in the roof, it is rather remarkable that this feature of a better light on the motors has not been more generally adopted.

Pending the return of the rescue men from the face, the visitors were again treated to the inspiring sight of the Madison company's fire-fighting machine in action, this time underground. The company officials seem to have anticipated all the possible contingencies of a mine fire with an almost inhuman ingenuity.

Thus, while all regular hose connections are being made and the different stations brought rapidly into action, there is one man equipped with an extra length of hose and nozzle, who goes rapidly from station to station, so that any defective apparatus may be promptly replaced. The foreman and his assistants are employed entirely in pacifying and reassuring the escaping miners. The importance of this latter feature cannot be too strongly emphasized as those of experience in such matters will readily concede; the moment the official personnel shows indication of weakening or losing control of the situation, discipline rapidly disintegrates and the rout becomes general.

In the immediate vicinity of the shaft bottom there are six hydrants, eight extinguishers and the same number of pump buckets. Water for the hose is obtained directly

THE COLORED RESCUE AND FIRST-AID TEAMS



FIRST-AID TEAM NO. 2 BRINGING PATIENT FROM THE MINE

through the mine pumps; provision is also made for cutting in water from the surface in event of the failure of the underground apparatus, for any reason. In addition to this there is the 50-gal. revolving chemical extinguisher, and perforated pipes in the stable, as already noted.

Underground First Aid

The fire drill was followed by the return of the first-aid men with the two "victims" of the explosion; they were carried on stretchers swung on the usual spring chains hooked over the sides of the cars. It was assumed that one was overcome by afterdamp and burned on the chest and right hand, while the second was supposed to be suffering from a broken left arm, a fracture of the left thigh and bleeding at the temple. Appropriate first aid was administered to each, the man overcome with afterdamp, being treated with the Salvatore oxygen apparatus and the pulmotor. Superintendent Duncan, of the Benton Rescue Station, complimented the rescue men highly, particularly on the application of splints; it was his opinion that their work exceeded the requirements of actual first-aid assistance.

The Company Ambulance and Physicians

The "patients" were removed to the underground hospital and the visitors made a further inspection, witnessing the operation of some automatic switches for landing the loaded trips at the shaft bottom, by a flying switch. Every car hoisted at this shaft is handled over one of these switches which has been in operation for more than a year and has not yet been the cause of an accident; even disregarding the cost of an extra man for handling the switch, Mr. Mooreshead expressed the belief that this method was superior, for the reason that it was purely mechanical in its operation and therefore eliminated the uncertainty of the human equation. In addition to this there are turnouts at different points where the motorman can throw the switch for either track while the trip continues at its normal speed.

Luncheon and the Inspection at No. 9

Returning to the surface the visitors saw the two "injured" men brought up and put in the ambulance to be transported to the hospital, about two miles distant. It is worthy of note with what infinite care all the minute details of an actual fire and explosion had been worked out and followed up. It is probable that such a complete all-around exhibition as this was never before attempted.

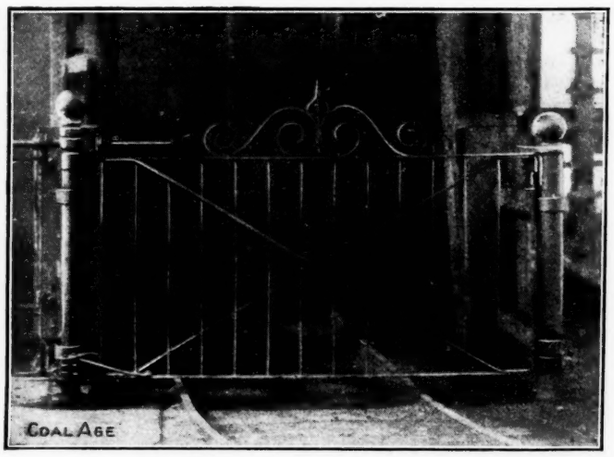
After a general wash-up, the visitors participated in a delicious and substantial luncheon, served by the ladies of the vicinity. The special train was again called into service and the party was conveyed to No. 8 Mine, which was in full operation. This plant is essentially a replica of the No. 9 Mine.

The visitors were again accorded a demonstration of fire-fighting on the surface, a description of which would only entail needless repetition of what occurred at No. 9 Mine. After an inspection of the surface plant the party went below and viewed the bottom arrangement at the shaft, which also resembled that at No. 9 Mine in the permanency and substantial character of the work.

A block-signal system for protecting trips against collision with each other was observed in operation here. Thus when an electric locomotive makes its flying switch, throwing the loads into the shaft bottom, while it goes into the empty "hole" for another trip, a red light out on the main haulageway warns approaching motormen that the bottom is occupied. Red lights are also installed at the automatic doors to warn the motormen of approaching trips on the other side. The automatic doors are provided with man-doors at one side.

Commendatory Remarks and the Hospital

Returning again to the surface some additional first-aid work was observed and a few brief speeches made,



The Automatic Safety Gates at the Shaft Top

in which the thanks of the party were extended to Mr. Moorshead and the heartiest approbation expressed of his men and methods. In reply Mr. Moorshead expressed his gratification at the interest shown and modestly disclaimed any particular credit to himself on the grounds that his work along this line was only made possible by the altruistic policy of the company he represented.

A brief visit was then made to the district superintendent's office, where the mine maps and office systems were seen, after which the party adojurned to the hospital. This latter is in charge of Dr. Springs and his wife, both of whom are graduates in medicine. The two "victims" of the mimic explosion were again seen here, carefully propped up in standard hospital cots. The hospital itself is equipped with an unusually thorough complement of surgical instruments and an excellent X-Ray machine. The general cleanliness and sanitary conditions at the hospital called forth favorable comments from all.

Returning once more to the train, the run was made into Carbondale, where the party disbanded at 4:30 in the afternoon.

EDITORIALS

In no industry is a closer study of conditions and methods of greater importance than in coal mining. In no calling is there a greater need of efficiency on the part of the individual worker than in the mining of coal. Intelligent supervision of all departments by the management is essential in promoting the highest individual and collective efficiency. Such intelligent supervision can only be attained by the close and continued study of conditions and a thorough familiarity with the principles of mining.

The Wooden Mine Car

Of the many inconsistencies in coal mining, none stands out more conspicuously than the continued general use of the leaky wooden end-gate mine car. We spend much thought and effort in evolving plans to prevent dust explosions, and yet cling to a practice that creates the evil we are working to overcome. There is no doubt but that leaky pit cars are the chief cause of finely powdered coal dust on the haulage roads in most of our coal mines. Wouldn't it be better if we started our preventative measures somewhere nearer the source of our troubles.

Another Petition

Some weeks ago, about 13,500 employees of the H. C. Frick Coke Co. petitioned Congress to prevent the dissolution of the United States Steel Corporation. More recently some of the men employed by the Tennessee Coal, Iron & Railroad Co. have sent a similar missive to Washington. This latter document contained no less than 13,000 signatures and weighed twenty pounds.

In both of the above instances, the action of the men was neither instigated nor fostered from "higher up," the signers of the petitions acting entirely upon their own initiative. Regardless of what action may be taken by the legislative or judicial branches of the government in the dissolution case above mentioned, one fact is established—over 26,000 perfectly sane and rational citizens in two widely separated states are not believers in indiscriminate "trust busting."

Where Progress is Opposed

It isn't always a question as to whether a certain system is most economical and efficient that determines whether the plan shall be adopted. In this day of organized labor, the employees of a company have much to say in the administration of its affairs. Especially is this true in European coal mines. One of the reasons machine mining has not been more generally adopted on the continent is because the miners believe the substitution of mechanical means for human labor is inimical to their welfare.

A company in Belgium was daring enough to experiment with machines, and found that in one of their collieries the cost of mining the coal was reduced 40c. a ton when undercutters were used. Notwithstanding the evident desirability of machines, this company could not overcome the hostility of their employees and persuade them that the undercutters would lighten their labor and increase their pay.

Just what the unions expect to gain through their opposition to modern machinery is hard to determine.

An Efficient Fire-Fighting Machine

We wish to invite particular attention to the article appearing in this issue on the rescue- and first-aid work of the Madison Coal Corporation in Illinois. Since the unfortunate Cherry catastrophe in that state, most stringent laws governing mining operations have been enacted by the Illinois legislature. As a result, safety precautions, methods and devices have probably been developed here to a higher general efficiency than in other fields.

The movement generally has met with the enthusiastic support of the leading coal men of the state, who, as a rule, have more than complied with the full requirements of the law. Naturally some leaders have appeared who are setting the pace, and among these is President Moorshead, of the Madison Coal Corporation. In a recent interview with Francis Peabody, of the powerful Peabody coal interests, and Carl Scholz, president of the Rock Island coal subsidiaries, both freely acknowledged Mr. Moorshead's leadership. We are particularly gratified, therefore, at being able to publish a detailed description of the Madison's men and methods.

The Nanticoke Movement

Last year at the town of Nanticoke, the school board and the Susquehanna Coal Co. both contributed to supply mining education for those desirous of such training. The innovation, based on the new law relative to occupational schools, was a complete success. This year, profiting by the indications obtained, commercial and domestic science classes are to be added.

We are convinced that the miner would resent the suggestion that there was nothing but muscle in his employment, and we are equally sure that to obtain success in a broad sense, the miner should combine knowledge, intelligence and enthusiasm. The mining schools will make this change. They give promise that hereafter there will be a scientific precision in operation from office to working face.

The Continent of America, 400 years ago, was physically better equipped to sustain a large population than it is today. It had limitless woods filled with comparatively harmless game, coal and iron were to be found outcropping on the hills, and the soil had all its original fertility. But the Indians starved, shivered in tents, had

no comforts, raised negligible crops and did not increase in numbers. Despite our waste of resources, conditions are better today than then, because the people are better informed and more resourceful.

Hence, in order to urge technical education, it is, we believe, not necessary to represent life as a strife between man and man, all seeking for preferment. The usual competitive cry is raised, now it is America seeking to crowd England or Germany out of its markets, now it is the miner seeking to be foreman. Skill is needed for other objects, to make it possible for us to gather from such resources as we now have such a measure of comfort, dignity and ease as education and skill will enable us to wrest from nature.

This is the answer—the only reply to those who would urge on us that only a certain number of men can occupy positions of trust. It is becoming clear that only by training can men succeed in operating with safety, efficiency and minimum labor in the modern mine, with all its dangers and complications. There is no use for brain till a brain is found. When men present themselves in numbers who have and can use their knowledge, we shall be able to place our mines on a higher basis, use machinery which demands that higher intelligence, and which will make possible not only larger economies, but less exhausting labor and higher earnings. The time will come when the mines will be operated like a railroad by engineers; every man who digs a ton of coal by machinery will be an expert in running the machine under his control, every motorman will understand, not merely how to throw a controller, but wind an armature.

The School in the Mining Town

The Tennessee Coal, Iron & Railroad Co. entertained the school teachers of the Birmingham, Ala., district at a hotel on Shades Mountain and, for a whole week, experts told them about education; not about cramming the students with book learning, but about the sociological aspects of their duties. For instructors should teach the children about health, cleanliness, thrift, safety and how to play, how to perform house duties, how to garden and to sew.

Particularly desirable is instruction in play, for any boy who is so taught, is free from the temptation to break windows, throw stones and terrorize the neighborhood. When manly games are popular, the necessity for boarding up the windows of idle houses and for locking and guarding store rooms is removed and the deterioration of the boys due to delay in putting them to work is largely prevented. The healthy rivalry makes the child approaching manhood appreciate the necessity for subjecting himself to rules and this training in later life will make him assertive of his rights, yet keen to respect those of others.

We long ago urged that in schools, children be taught regarding the right use of the home, so that better houses could be intrusted to tenants and also about safe practices in mines and out of them. But the instructors of the teachers around Birmingham have gone even further; they would have the students warned against loan sharks, and patent-medicine venders. They are seeking to promote public-school libraries and to popularize training in manual occupations, music, art and science.

In a few years the miner who seeks a good education for his children will not have to send them to the normal school to be educated. The farmer may always suffer that drawback, but there is little cause in our larger mining towns for inadequate schools if we can only inspire that same spirit in the rank and file of the miners which the farmers now possess. The foreign miner will doubtless always be somewhat of a drawback, but even he can be made to appreciate educational advantages.

The public school is not a place for political propaganda, but it is the appropriate opportunity for grounding our boys and girls in the arts of right living, decent home life, generosity, good citizenship and charitable estimates of their fellowmen. Time was when the mining population of a village prided itself that it could beat up the citizens of some neighboring lumber town or could ride rough shod over the policemen and merchants of a near-by borough. Present ideals are better, though still not of the best. As the school does its work, rivalry in violence will give way to competition of a less destructive and more amiable character and our labor situation will be freed from breaches of contract and outbursts of vandalism.

The American Mining Congress

The sixteenth annual session of the American Mining Congress, which was held in Philadelphia this week, was a quality meeting rather than a quantity affair. A number of men were present whose names stand for all that is biggest and best in American coal mining. The papers and discussions dealt with such vital topics as "Taxation of Mining Property," "Mine Accounting," "Mine Rescue Work," "Coal-Mining Legislation" and "Cost of Production." All of these papers and discussions will appear in COAL AGE next week.

The mining-machinery exposition in Horticultural Hall was a much more complete exhibit of the kind than is usually the case and was deserving of closer attention and better attendance. In fact, the mining congress, on the whole, is a laudable enterprise if it can be brought to fulfill the purpose for which it was conceived. As an institution, or viewed in the light of a movement for betterment in mining conditions, the American Mining Congress today is not a national body of great importance, although the intent is there and magnificent possibilities exist.

Harmonizing the work of many different departments in all industrial operations is more essential to success than to establish and maintain a high-pressure system, in which the employees are forced to work under a strain that is nerve-racking in the extreme. Just as an expert engineer knows instantly by the throb of his engine when the load is excessive, so the intelligent manager knows by the response of his men when the system needs revision and the conditions amelioration. Not that the day's labor should be shortened, or the wages increased; but that the work should be readjusted and made to run more smoothly. It is even more important for the manager or superintendent to study to harmonize working conditions, than that he should continually strive to reduce the cost of production by lengthening the hours of labor, cutting down wages or requiring more work for the same pay.

Recent Legal Decisions

By A. L. H. Street*

Responsibility to Third Person's Employees—A coal company which permitted another company to use its railroad yards was under no duty to a coal miner employed by the other company and riding on one of that company's locomotives to promulgate rules for the movement of locomotives in the yards to avoid a collision such as resulted in the miner's death. **(Virginia Supreme Court of Appeals, Steele's Administrator vs. Colonial Coal & Coke Co., 79 Southeastern Reporter 346.)**

Places which Must Be Kept Safe for Miners—Although a mine operator owes no duty to a miner to keep in reasonably safe condition places where the latter is not supposed or required to be in the course of his work, a miner is entitled to recover for injury received on account of an unsafe mine entry while he was passing through it to notify a driver that his cars were loaded, pursuant to orders received by him and to custom. **(Kentucky Court of Appeals, Jellico Coal Mining Co. vs. Woods, 159 Southwestern Reporter 530.)**

What Does not Constitute "Doing Business"?—Giving of a mortgage by a New York coal company to another New York corporation, covering land situated in Tennessee, did not constitute a doing of business within the meaning of the laws of the latter state which prohibit transactions of business therein by a foreign corporation which has not filed a copy of its articles of incorporation with the secretary of state, so as to invalidate the mortgage. **(United States District Court, In re Tennessee Coal Co., 206 Federal Reporter 802.)**

Validity and Effect of Wyoming Mine Law—The statutes of Wyoming which require coal mine operators to employ expert mine bosses to inspect their mines and to see that all loose coal, slate and rock are carefully propped and secured against falling, and authorizing recovery for injury to an employee resulting from failure to perform such duty are constitutional. The law does not abrogate the defense of assumption of risk in personal injury cases, so far as the ordinary risks of mining are concerned, but it does avoid that defense as to risks arising from non-compliance with its provisions. **(Utah Supreme Court, Bakka vs. Kemmerer Coal Co., 134 Pacific Reporter 888.)**

*Attorney-at-Law, St. Paul, Minn.

International Exposition of Safety and Sanitation

An exhibition showing what has been done in this and other countries for the promotion of safety and sanitation among workers and others will be held under the auspices of the American Museum of Safety at the Grand Central Palace, Lexington Avenue and 46th to 47th Sts., New York City, between Dec. 11 and Dec. 20. This exposition will have eleven sections, covering selective exhibits, electrical safeguards, railroad safety devices, street railway contrivances for preventing accidents, precautions to prevent accidents at sea, industrial hygiene, occupational diseases and poisons, alcoholism, mutual liability insurance and workmen's compensation, and lighting.

The project, as might well be expected, owing to the strong support already accorded to the American Museum of Safety, is backed by most of the leading workers and authorities in industrial safety and medicine. Its success is unquestionably assured. All applications for floor space can be made to the American Museum of Safety, 29 West 39th St., New York. A charge will be made for this space in order to cover the expenses of the exhibition and of the safety congresses.

The Nanticoke District Mining Institute

The third annual dinner of the Nanticoke District Mining Institute was held in the Nanticoke State Armory, Oct. 18, 1913. About 700 persons attended the excellent banquet provided.

The annual report was read by President William H. Morgans. Mr. Morgans stated that there were 700 members, 40 per cent. more than last year. He urged that those boys who left school at an early age be required, for four years, to attend night school and thus make up the attendance which would otherwise be missed.

Judge Peter O'Boyle discussed uplift and brotherhood, and J. H. Bigelow, district attorney for Luzerne County, spoke on patriotism. J. H. Odell, the editor of the Tribune-Republican of Scranton, addressed the assemblage in a forcible speech on the dominance of brain and its superiority over muscular force.

The Nanticoke Mining Institute has had a most successful year. By coöperation with the Susquehanna Coal Co. and the School Board of Nanticoke, it has succeeded in having started one of two first tax-supported mining schools in the state. The commonwealth has now come to the assistance of the village board and pays two-thirds of the cost, the school board providing the other third. The success is phenomenal, and as a result the board is starting an evening commercial school with 235 pupils and a night school in domestic science, in which 152 have enrolled.

The movement thus started almost concurrently at this point and at Ellsworth, Penn., is sure to spread all over the commonwealth of Pennsylvania and in other mining states, but the state and other authorities are endeavoring to put the movement on a firm basis before attempting to extend its operation elsewhere.

The Thinker

By Berton Braley

(From "American Machinist.")

Back of the beating hammer
By which the steel is wrought,
Back of the workshop's clamor
The seeker may find the Thought;
The Thought that is ever master
Of iron and steam and steel,
That rises above disaster
And tramples it under heel!

The drudge may fret and tinker
Or labor with lusty blows,
But back of him stands the Thinker,
The clear-eyed man who Knows;
For into each plow or saber,
Each piece and part and whole,
Must go the Brains of Labor
Which gives the work a soul!

Back of the motor's humming,
Back of the belts that sing,
Back of the hammer's drumming,
Back of the cranes that swing,
There is the eye which scans them,
Watching through stress and strain,
There is the Mind which plans them
—Back of the brawn, the Brain!

Might of the roaring boiler,
Force of the engine's thrust,
Strength of the sweating toiler,
Greatly in these we trust;
But back of them stands the Schemer,
The Thinker who drives things through
Back of the Job—the Dreamer
Who's making the dream come true!

DISCUSSION BY READERS

Collapsible Stoppings

Letter No. 5—The question of the effect and efficacy of collapsible stoppings, as a means of localizing and reducing the disastrous range of an explosion, at its initial point, will become more important on investigation than at first appears; and, for that reason, is worthy of the best thought and attention of mining men of broad experience.

As the discussion of the question proceeds, the term, "permanent stopping," perhaps will be used quite as frequently as the term "collapsible stopping." As already indicated, opinions may differ widely as to what constitutes the one or the other, under certain conditions. It appears to me, however, that a permanent stopping might well be defined as one made of brick, stone or concrete, and strong and massive enough to withstand all ordinary forces and pressures to which it may be exposed; while a collapsible stopping might be defined as one constructed of wood or a single course of brick, and easily blown out when subjected to an extra force or pressure. These terms apply alike to the stoppings of mines containing both gas and dust, which in all cases are to be air-tight.

I have noted with interest what Dr. J. J. Rutledge, mining engineer, Bureau of Mines, says, in his article, relative to the kind or nature of stoppings to be used on main entries, slopes and haulage ways. I agree with him only to the extent that these substantially built stoppings should be used in mines generating neither gas nor dust; or in mines covering extensive territories and then only near the outside. For small mines that generate either gas or dust or both, I would prefer stoppings of a collapsible nature on all main entries and haulage ways.

As an argument in support of this contention, I submit the following incident, which occurred in the Nelson mine, operated by the Dayton Coal & Iron Co., Dayton, Tenn., and with which I am familiar in every detail. The mine was dusty and generated gas, and was operated exclusively with safety lamps. All shots were fired by shotfirers after the other employees had left the mine. Owing to a difference of time, as shown by time pieces, on Mar. 30, 1902, the shotfirers fired a few minutes early. An explosion occurred, instantly killing 16 men who had not yet reached the outside of the mine, but were on the main haulageway.

This was purely a dust explosion and was caused by a blownout shot in a dip room, distant about 300 ft. from the main entry and at a point a little more than 1000 yd. from the mine entrance. The force of this explosion traveled mainly toward the outside, producing a report at the mine portal, equal to that of about one pound of dynamite exploded in the open air. The stoppings along the main entry of this mine were constructed of stone and clay, with an average thickness of four feet, and were supposed to be permanent. The force and pressure developed by the explosion, in its course, was so great that these supposed permanent stoppings near the outside were blown out, and in some instances scarcely a trace of them remained.

My opinion is that if the stoppings along the main entry near the seat of the explosion, had been of a collapsible nature, the force of the explosion would have blown them out and been dissipated in the old workings faster than it developed energy on the haulageway; and, as a result, the explosion would have subsided before going far and few if any of the 16 miners would have been killed.

JOHN ROSE,
District Mine Inspector.

Dayton, Tenn.

Letter No. 6—The question of building stoppings in mines is, to me, one of great importance. For a year and a half I did little else than build brattices, overcasts, doors and stoppings. To my mind, these should always be built in a substantial manner. When a bratticeman puts in a stopping, he should build it so that it cannot be shot out by any blast that may be fired. I believe in the old saying: "That which is worth doing at all is worth doing well."

I have witnessed many explosions where the mine stoppings have been put up in different ways, but have not observed that these produced any different effect on the explosion. It is my belief that all main-entry stoppings should be substantially built of concrete, brick or masonry. Cross-entry stoppings may be put in with shiplap lumber, but should be made solid, substantial and air-tight to prevent any leakage of air through them. In my experience, room stoppings are of less importance. I do not believe in building any so called collapsible stoppings.

JOHN SUTTON.

West Terre Haute, Ind.

Starting Fan after Explosion

Letter No. 5—The question of restoring the circulation of air in a mine, immediately following an explosion, by starting the fan that was partially disabled and that required some repairs, or by other means, is an important one. We may theorize till weary, but this method often provides the only hope of rescue for those who have fortunately survived the blast. It matters little how much the attempt to enter the mine at once may be deprecated by those less interested or may be condemned in print, as long as explosions occur brave miners will refuse to see anything but their fellow workmen in dire distress or hear any sound but the frantic pleadings of wives and children for the rescue of their loved ones. It is well this is so, for such men will be required, from time to time, as long as coal is mined.

The vital question is, how to enter the mine with the minimum of risk. The occasion demands a cool head and capable judgment, combined with a determined character. Brave but rash would-be rescuers must be con-

trolled and a selection of the best men made, to form an exploring party. If a helmet squad is available they should enter the mine and advance, as far as possible, ahead of the air, to ascertain the condition of the mine with respect to fire, gas and the circulation of air. By this means, any fires that might exist would be discovered before the air current is restored in that part of the mine. After exploring a certain section and finding no fire, this party should return and report the condition of the mine to the men charged with the duty of restoring the ventilation. When that has been accomplished in one section or portion of the mine, another section can be explored and the circulation restored there, in the same manner.

Assuming that the fan has suffered no injury from the explosion, however, it should be slowed down so as to furnish only sufficient air to force back the products of combustion, to the point on the main entry where the air is made to return, whether this be a blownout stopping or an overcast. At this point, a regulator or canvas brattice should be erected, so that the quantity of air passing here can be controlled until the next crosscut is reached when this opening should be stopped and a regulator or canvas brattice established at the next opening, for the same purpose.

While thus advancing through the entries, the air should be carefully tested, at frequent intervals with a safety lamp, and a careful watch be kept to detect any fire that may exist in adjoining workings. By pursuing this course, the danger of a second explosion occurring is minimized and the rescue of any possible survivors is made possible, in the shortest time. I have proved the efficiency of this method in a particular case, and have no hesitancy in recommending its general adoption.

CHARLTON DIXON.

Pittsburgh, Penn.

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Letter No. 6—The advisability of again starting a fan disabled by an explosion, as specified in the question under discussion, can only be answered directly by saying, in the most emphatic manner, that to start the fan previous to making a most careful preliminary examination underground, as far as practicable, would be both unwise and criminal, and would probably destroy all hope of the rescue of any survivors and endanger the life of those who attempt to enter the mine.

Even after such preliminary examination of the mine has been made, the question of starting the fan will depend entirely on the conditions found to exist underground, and whether restoring the circulation will imperil the entombed workmen or increase the danger of rescue work. The existence of mine fires would be the chief determining factor. The question that must be considered is: What will be the probable effect in the mine if the fan is started even at a slow speed?

In my opinion, whatever the condition found below, with respect to the stoppings, overcasts, doors, etc., if fires exist in the workings, they will produce a disturbance of equilibrium in the mine air and start a circulation of air that will make a second explosion imminent, without the assistance of the fan. It may be supposed, however, that if the fan is started, its action may either assist or oppose the natural current produced by the heat of the fire, according as that current is traveling with or against the current induced by the fan. Thus, in either case, unless the speed of the fan be properly regulated, the result would be favorable to the occurrence of a second explosion. These conditions can only be ascertained by a careful preliminary examination underground.

While the direction of air current and the possible existence of fires might be ascertained by indications at the surface, it will be important to know in what sections of the mine fires exist; and to ascertain this, it is necessary to explore the shaft bottom and gradually extend the investigation through the mine. This will determine whether, if the fan be put in operation, the current will be short-circuited near the shaft bottom or extended to more distant parts of the mine, and will reveal the existence and location of fires, if any exist.

But, whatever the conditions with respect to restoring the ventilation in the workings may be, one fact impresses me as of the utmost importance; namely, to destroy as far as possible, any natural currents of air that may be induced by the heat of the fire, and thus to prevent the access of fresh air to the fire areas as these are found to exist. If this is accomplished successfully, I see no reason why there would be any additional risk incurred by restoring the circulation between the intake and return openings of the mine, by starting the fan slowly, providing the air current be short-circuited at the proper point and not allowed to enter workings that have not been explored. This being accomplished, a more extended exploration can then be made with breathing apparatus.

I. C. PARFITT.

Jerome, Penn.

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The Safety Lamp and the Eyesight

On returning home from the West and reading the article of John Rose, in regard to the effect the safety lamp produces on the eyesight of miners, COAL AGE, Sept. 27, p. 465, I want to add a few words. I have worked in the mines from the time I was a boy, 11 years old, for the past 36 years, and have filled every place, digging coal, bossing, superintending and managing. A few years ago I visited the Barnsley district, in Yorkshire, England, where there are some of the largest collieries, worked exclusively with safety lamps. The miners of that district had the superstition that the wearing of bright-gold ear-rings, in some way, reduced the effect they supposed was produced on the eyesight by the brightly polished brass of the lamps.

My experience, after many years' use of the safety lamp, teaches me that all men do not have the same eyes; nor does the safety lamp have the same effect on all men's sight, just as the same medicine will not affect all men alike. What will cure one man will kill another. Some men have good, bright eyes, while others have weak eyes. Some miners can work in gas all day without complaining of headache at the end of the shift; while other men can hardly walk home because of the effect of the gas. This used to be my case, but it is not so today. I believe the same is true of the safety lamp; what will blind one man will not hurt his fellow.

Mr. Rose says a man can load as many cars with the safety lamp and timber his working place as well, as when using an open light. This may be true; but, as Mr. Rose adds, it seems a little "unreasonable." I believe very much depends on the condition of the mine, the thickness

of the coal and the class of work, whether room-and-pillar, long wall, or some other system. Mr. Rose states that he has worked eight years with open lights, followed by 13 years with safety lamps. I do not doubt his statement, but I am inclined to believe that he was not mining coal for 13 years with the safety lamp. A part, or all of that time, he may have been a "walking boss;" but the effect of the lamp on the eyes is greater when mining coal with the pick.

SAMSON SMITH,
Mineral, Va. Mining Engineer.

Fire Protection in Mines

In addition to what has been said, COAL AGE, Sept. 13, p. 391, in regard to adequate fire protection in mines, I want to suggest that statistics show that there are more fires occurring in mines where open lights are used than where safety lamps are employed.

Among the numerous causes of mine fires may be mentioned: A blast setting fire to a gas feeder, which ignites the coal; gob fires occurring mostly in abandoned portions of mines and, especially, in mines where the coal absorbs oxygen readily. I believe such coals have a low percentage of carbon and a high percentage of moisture. Sulphur in the coal increases the tendency to fire.

The old proverb, "An ounce of prevention is worth a pound of cure," teaches that it is more important to provide ways and means to prevent fires in mines than to study how to extinguish fires after they have started, although we must be prepared to do both. An important matter is to carry a pipe line along the main entry, with connections at each cross-entry and fire plugs at short intervals, where hose may be attached. The lack of an adequate water supply, in the mine, has often resulted in great loss.

There is one other point I want to mention. It is in reference to fires that are started by the ignition of gas, in blasting. To avoid this danger, every working place should be examined as soon as practicable after shots have been fired. In many mines, the first examination of the working face, after shotfiring, is that made by the fireboss, in the early morning, from 7 to 10 hr. after the shots are fired. It frequently happens that the fireboss, at that time, discovers a fire that has gained a considerable hold in the chamber where it started. In many cases, an entire section of the mine is thrown idle as the result, and several days are required to extinguish the fire. This could all have been avoided by an earlier examination of the working face.

JOHN SUTTON.
West Terre Haute, Ind.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

HEAT

Definition—Heat is now understood to be a form of motion. All matter is assumed to be in a state of molecular vibration. The rapidity of the vibration depends on the degree of heating of the mass. The theory assumes that the amplitude of the vibrations or the swing of the molecules is greater as the density of the mass is less. This would lead naturally to the conclusion that pressure, which increases the density of matter, will decrease the amplitude and increase the rapidity of vibration.

Heat is thus assumed to be a form of energy, the amplitude and rapidity of the vibrations being functions, respectively, of pressure and velocity, the factors of energy, in mechanics. The theory is well supported by observed facts, as the blow of a hammer or the friction of rubbing surfaces alike develop heat.

Heat In Bodies—Assuming that heat is a form of molecular vibration, which varies in different kinds of matter, it is clear that each kind of matter has its own peculiar capacity for heat. This is shown to be the case by the fact that different bodies when exposed to the same source of heat are heated differently. For example, when equal weights of water and mercury are exposed, for the same time, to the same heat it is found that the mercury becomes much hotter than the water. When water and mercury at the same temperature are allowed to cool in the atmosphere, the air absorbing the same heat from each, the mercury is found to cool much quicker than the water. It is evident that the water absorbs more heat and gives out more heat, per pound, than the mercury, for the same change in temperature. In other words, water has a greater heat capacity.

Temperature—The temperature of any body or mass of matter is the degre of heat it can radiate or impart to other bodies or matter with which it is in contact; or, in other words, the degree of sensible heat of the body. It is not the amount of heat in the body; as water contains 30 times the quantity of heat contained in an equal weight of mercury, at the same temperature.

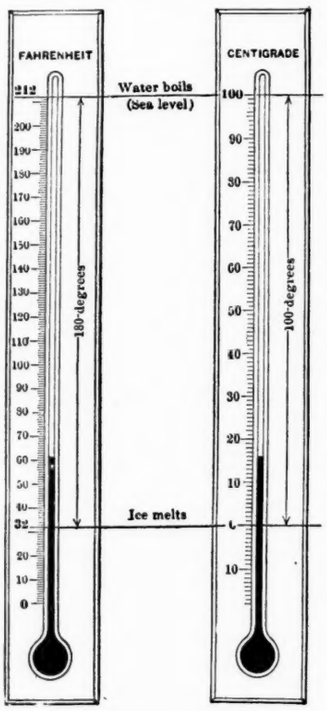
The temperature of a body depends on the quantity of heat the body contains, per unit weight, and its heat capacity. A body or matter having a large heat capacity will have a comparatively low temperature.

Sensible Heat—The heat that when absorbed or given out by a body is accompanied by a change of temperature is called "sensible heat" because it is manifest to the senses.

Latent Heat—When matter passes from the solid to the liquid state, or from the liquid to the gaseous state, the change is always accompanied by the absorption of a considerable amount of heat, although the temperature remains constant. The heat thus absorbed is called the "latent heat," being absorbed in performing the work of driving the molecules of matter farther apart than they were in the previous state. This heat is again given out when the matter passes from a gas to a liquid, or from a liquid to a solid.

The Coal Age Pocket Book

How Temperature Is Measured—Temperature is measured by the thermometer, an instrument so common as to need no description. The principle involved is that the expansion of the liquid contained in the bulb of the thermometer is much magnified in the capillary stem. Any rise of temperature is thus clearly indicated by a corresponding rise of the liquid in the stem and a fall of temperature is likewise accompanied by the contraction of the liquid, which drops in the stem.



TWO THERMOMETER SCALES

Readings above zero are plus (+) and those below zero minus (—).

Two Scales—There are two principal thermometer scales, the Fahrenheit and the Centigrade. These are each calibrated with reference to the freezing and boiling points of water. As shown in the accompanying figure these points are marked 32 and 212 deg., respectively, in the Fahrenheit, and 0 and 100 deg., respectively, in the Centigrade scale. Thus, 180 deg. of the former correspond to 100 deg. of the latter; or the ratio is 9:5.

To convert Fahrenheit (F.) readings into Centigrade (C) or vice versa, the following formulas are useful:

$$F = \tfrac{9}{5} C + 32$$
$$C = \tfrac{5}{9} (F - 32)$$

Example—(a) What are the readings of the Fahrenheit scale corresponding to 40°, and —10° Centigrade?

Solution—

$F = \tfrac{9}{5} \times 40 + 32 = 104°\ F.$

$F = \tfrac{9}{5} (-10) + 32 = 14°\ F.$

Example—Convert —4 F. and 50 F. into Centigrade readings.

Solution—

$C = \tfrac{5}{9} (-4 - 32) = -20\ C.$

$C = \tfrac{5}{9} (50 - 32) = 10\ C.$

EXAMINATION QUESTIONS

Miscellaneous Questions

Ques.—What is a windy or blown-out shot?

Ans.—There is, or should be, a slight difference in the meaning of these terms. A "windy" shot is one that produces a heavy concussion of the air, because much of the energy of the powder is expended on the air. The shot may or may not have blown its tamping. It may have broken the coal, or may have found vent through a crack or crevice; but, in any case, the energy of the powder is not wholly absorbed in the work of breaking the coal, as is the case when the shot works properly.

A blownout shot is one that blows its tamping without breaking the coal. The effect produced is quite similar to that of a windy shot; but the projected flame is, generally, more intense and the shot liable to prove more dangerous.

Ques.—What are the causes of windy shots?

Ans.—The chief causes that give rise to windy shots are: 1. Too great a charge of powder for the work to be accomplished. 2. The exploding charge finding vent through a crack or crevice, or blowing out through a soft stratum of the seam. 3. The use of different grades of powder, at the same time, in the same hole.

Ques.—What are the chief causes of blownout shots?

Ans.—The principal causes of blownout shots are: 1. Too small a charge of powder for the work to be performed in breaking the coal. 2. The shot being unable to free itself, as when roof-bound, or when the hole is drilled perpendicular to the face, with no side cut or mining, or when the charge is laid too deep on the solid. 3. The hole having too great a diameter for the quantity of charge. 4. Insufficient or poor tamping. 5. The hole being tamped with coal slack or other combustible material. 6. The use of too quick a powder.

Ques.—Name some conditions under which a windy or blownout shot may prove dangerous.

Ans.—Such a shot is dangerous in a dry mine, where dust and fine coal have been allowed to accumulate at the working face, particularly if the coal is highly inflammable. Also, in the working of a gaseous seam, where the gas is liable to accumulate over the waste and on the "falls" or in other void places that are difficult to ventilate. The concussion of a windy shot is liable to throw much dust into the air or dislodge the gas from its lurking place, which may then be ignited by the flame of succeeding shots. The projected flame of a blownout shot may raise and ignite the dust and accumulated gas.

Ques.—How is the size of mine cars affected by (a) thin coal; (b) poor roof?

Ans.—The mining of a thin seam of coal in which the cars must be taken to the face will require building low cars. In this case, in order to provide a suitable tonnage or capacity for each car, if the conditions permit the cars must be built broad and long.

(b) A poor roof always requires narrow openings or roadways; and, for a given capacity or tonnage, the cars, in this case, must be built as high and as long as possible; since the width of the car is limited by the width of the opening, after leaving sufficient clearance at the side of the roadway.

Ques.—What is the breaking strain and safe working load of a good steel rope 1⅛ in. in diameter?

Ans.—The breaking strain of a crucible-steel 1-in. rope is 39 tons. On this basis, the breaking strain for a 1⅛-in. crucible-steel rope is $39\ d^2 = 39\ (1⅛)^2 = 49.36$ tons. The safe working load, for this rope, will depend largely on the depth of the shaft and the speed of hoisting. In common mine practice where the depth of the shaft does not exceed 100 yd. and the speed of hoisting is not greater than 20 ft. per sec., a factor of safety of 5 may be used, making the safe working load, in this case, say 10 tons. In deeper shafts with a greater speed of hoisting, say up to 50 ft. per sec., a factor of safety of 8 or even 10 should be used, making the safe working load, then, say from 5 to 6 tons.

Ques.—In a 12-in. column pipe 450 ft. long, on a 42-deg. pitch: (a) What would be the pressure per square inch at the bottom of the pipe? (b) What would be the total weight of water in the pipe, in tons?

Ans.—On this pitch, the vertical rise of a pipe 450 ft. long is $450 \times \sin 42° = 450 \times 0.669 = 301$ ft. The sectional area of the 12-in. pipe is $0.7854 \times 12^2 = 113$ sq.in.

(a) When the pump is not in action, there is, at the bottom of the pipe, a static pressure of 0.434 lb. per sq.in., for each foot of vertical height or water column. The pressure, in this case, therefore, is $0.434 \times 301 = 130.6$ lb. per sq.in.

(b) The total weight of water in the pipe, taking the unit weight of water as 62.5 lb. per cu.ft., is $(113 \times 450 \times 62.5) \div (144 \times 2000) = 11.035$ tons.

Ques.—The main entry in a mine runs due west; at a point 600 ft. from the shaft bottom a cross-entry has been run due north for a distance of 160 ft. This cross-entry caved in and was lost. In order to reach the coal at the head of the entry, it is resolved to start a cutoff on the main entry 400 ft. from the shaft. Find the length and the bearing of this cutoff.

Ans.—The distance from the point where the cutoff is to be started to the mouth of the cross-entry is $600 - 400 = 200$ ft. The cutoff forms the hypotenuse of a right triangle, therefore, whose sides are 200 and 160 ft., respectively. The length of the cutoff is then

$$\sqrt{160^2 + 200^2} = 256 + ft.$$

The bearing of the cutoff is the angle that it makes with a due north and south line, or the angle between the cutoff and the cross-entry. The tangent of this angle is $200 \div 160 = 1.25$; and the angle of the bearing is, therefore, 51 deg. 20 min. The bearing of the cutoff is then N 51° 20′ W.

The length of the cutoff can be found, also, thus

$$\frac{200}{Sin\ 51° 20'} = \frac{200}{0.7808} = 256 + ft.$$

COAL AND COKE NEWS

Washington, D. C.

The Government has filed a brief with the Supreme Court in behalf of F. W. Howbert, Collector of Internal Revenue for the District of Colorado, in the case of "Stratton's Independence Ltd.," this being the case involving the applicability of the corporation tax to mining corporations, the contested issue in which was the matter of depreciation allowance, fully dealt with in these pages heretofore.

Three questions were certified to the Supreme Court—whether the act applies to mining corporations, whether the proceeds of ores mined by corporations are income, and whether if they are income such a corporation is entitled to deduct the value of ore as depreciation.

After contending that the act is applicable to mining corporations the Government brief goes on to argue that the proceeds of the ore is income, contending that:

When capital is by labor changed from a fund into a flow, it necessarily changes its character from capital to income. In the case of a mine, the mineral as it lies in the ground is capital, but when it is extracted, converted into ore and sold, the result is a flow; the tree has borne fruit, and income has accrued.

The argument that, since this flow necessarily results in depletion or exhaustion of capital, therefore, the flow is a flow of capital and not of income, is entirely fallacious, according to the above definitions, the understanding of business men, and the practical necessities of a tax based on income. The law takes things as it finds them; it taxes property under the character which the owner has impressed on it, and where that owner voluntarily changes his funds of capital into a flow of income the law accepts the designation and taxes him accordingly.

The brief goes on to say that an ordinary life tenant may not open new mines but when opened he may work them even to exhaustion, while a lease by the State of the mineral under its public land would not be a sale of such lands and the payment of dividends by a mining company out of the proceeds of ore is not a payment of capital. Moreover the fact that the operation of a mine may decrease its valuation does not prevent profits not spent in dividends from being called surplus. Lastly it has been held by the Supreme Court of Pennsylvania that oil companies and mining companies have incomes within the meaning of an income tax act.

In summing up the Government says that: "The principle for which the mining companies contend is not applicable to them alone, and if applied generally, as it must be if applied at all, would seriously hamper the working of an income tax. A pension or a terminable annuity produces an income at the expense of capital, but who would think of calling such produce any the less income?"

As for the claim that depreciation ought to be allowed on the ore the Government says:

In the absence of any showing to the contrary, the word "depreciation" here must be given its ordinary meaning in business usage, and also it must be taken as similar in meaning to a "loss." So considered, depletion of capital cannot be called "depreciation," nor would any business man think of so calling it.

When capital is converted into income, as when a loaf of bread is eaten it cannot be said that the capital has "depreciated;" it has merely been converted into another form. "Depreciation" takes place when the capital retaining its form, decreases in value owing to wear and tear, change of fashion or methods of manufacture, or the like. When a fund of capital in a mine consisting of the ore in place is converted into a flow of income resulting in money to the owners, the ore has not depreciated; it has suffered a change. Gold is mainly valuable because it does not depreciate. The buildings, machinery, shafts, etc., do depreciate. They retain their form and use, but their value diminishes at different ratios with different causes.

If a man have a stock of goods and he sells some and the balance becomes worthless through a change of fashion, it would be absurd to call the two processes by the same name, nor would any business man carry the results to the same account. In fact in the Nipissing Mines Co. case, in which a writ of certiorari from this court is asked, the company in its second return abandoned the theory of depreciation and replaced it with the items "return of capital," "distribution of capital nontaxable."

In closing the claim is made that because the mining company never actually retained any sum and applied it to depreciation, but distributed the income, in the form of dividends, no claim for depreciation can justly be made. The brief further undertakes to apply the reason in the case to coal mining companies as well as to those engaged in metal mining.

HARRISBURG, PENN.

The Lehigh Coal and Navigation Co., one of the defendants in the suit brought by the Government last September to dissolve the so called "anthracite coal trust," filed answer on Saturday, Oct. 18, making general denials. This suit is primarily against the Philadelphia & Reading Railway Co. and other coal-carrying railroads, charging illegal combination in restraint of trade in violation of the Sherman antitrust act and the commodities clause of the Interstate Commerce Act.

The Lehigh Coal and Navigation Co. denies any community of interest between it and the Philadelphia & Reading Railway Co., the Philadelphia & Reading Coal & Iron Co., and the Reading Co., through its directorship, contract or otherwise. It also denies entering into a combination to stifle competition in the sale of anthracite coal.

The answer gives a history of the company since its formation in 1822, with a detailed account of the acquisition of canals, railroads and coal lands in Pennsylvania. The defendant contends that, had it not been for the ownership of mines by companies that built canals and roads, these never would have been built. The company denies any alliance with the Central Railroad of New Jersey designed to suppress competition.

The answer of the Reading Co., which is expected to be most important in the defense, is expected to be filed in a week or ten days.

Good Car Service to Coal Mines

The car service furnished the coal and coke trade by the railroads is conceded to be above the average and about as perfect as possible. For years past the operators have been furnished with sufficient cars to move their output when as now other interests suffered from lack of transportation. In return for this service the railroads have asked the operators to make their service go as far as possible by loading cars to capacity.

At a meeting held last week between about 35 coke operators and representatives of the railroads, the transportation representatives made a plea for better lading. The new steel cars have a capacity of 50 tons. A great proportion of them are going out under 40 tons. The lading runs from 36 to 41 tons. Other cars are also loaded short. The railroad managers presented some calculations showing how this poor lading kept cars in service in the coke region that could be profitably employed in the coal trade and thus deprived the railroads of valuable revenue. It was estimated that with proper lading in the coke region the railroads would have 3000 cars more to put into the coal trade. These cars are constructed to haul coal, coke, ore and limestone, and can be utilized in any of these industries.

The coke operators confessed that they did not want to load too full because of the loss of coke by being jarred off the tops of the cars. It was pointed out, furthermore, that the specific gravity of the coke varies considerably in different portions of the Connellsville region. The operators, however, acknowledged the justice of the railroads' complaint, and promised to do all they could to remedy the conditions.

More Button Strikes

The numerous button strikes at the mines in the anthracite region are clearly contrary to the agreement between the representatives of the miners and the operators. The award of the original Strike Commission, to which both parties subscribed, says:

It is adjudged and awarded, that no person shall be refused employment, or in any way be discriminated against, on account of membership or nonmembership in any labor organization and there shall be no discrimination against or interference with any employee who is not a member of any labor organization by members of such organization.

It is apparent that the operators are living up to their part of the agreement. Refusal on the part of the employees at a number of collieries to work with men who do not belong to the union, or who are in arrears in their dues, is a form of discrimination expressly denounced by the Commission. At this time of the year when there is a big demand for coal, both the employees and the operators are put

to a serious loss by the suspension of operations for days, sometimes weeks at a time. It is understood that the union officials are averse to the button strikes. It will be to the miners' interests and to the officials' interests, in future negotiations with the operators to abide by the stipulations of previous contracts.

The strikes during the past year have become so expensive and annoying to both sides that some definite arrangement should be entered into to continue until the expiration of the present contract.

PENNSYLVANIA

Anthracite

Harrisburg—The Pennsylvania, New York & New Jersey Power Co., of Scranton, has filed the biggest return of an increase of stock or debt known at the capitol in a long time. The stock was increased from $405,000 to $5,000,000, and notice given of authority to issue bonds to the amount of $25,000,000.

Pittston—After being abandoned for fifteen years the Schooley colliery is to be opened and operated by the Pennsylvania Coal Co., which has bought the property. Pumps are now drawing out the water which flooded the workings of the mine 15 years ago when a cave occurred under the river bed.

Hazleton—The Lehigh Valley Coal Co. is preparing to tear down the company houses at Laurel Hill prepartory to stripping operations.

The G. B. Markle Co. has completed arrangements for the erection of a modern club house for the use of its mine employees. This company, to insure a more plentiful and certain supply of water for its mine workings, is drilling three artesian wells.

Wilkes-Barre, Penn.—Damages to the amount of $4000 was the verdict awarded Joseph Zizkie in a suit against the Pennsylvania Coal Co. for the loss of his arm. The plaintiff was employed as a brakeman on a mine motor at No. 14 colliery and while seated on the front of the machine sanding the rail it collided with two cars left standing on the track and he was badly injured, one of his arms having to be amputated. The company was charged with negligence in not having a suitable headlight and a sanding device on the motor.

Shamokin—In a terrific explosion of gas on Oct. 17, at Bear Valley shaft, operated by the Philadelphia & Reading Coal & Iron Co., four miners were severely burned, probably fatally. Members of the first-aid corps quickly arrived, and after bathing the victims in oil, wrapped them in blankets and conveyed them to the surface. The explosion was probably caused by one of the victims exposing a naked lamp in a corner full of gas.

Two miners while mining coal at the Mineral R.R. & Mining Co.'s Luke Fidler Colliery on the same day were fatally burned by a gas explosion caused in a peculiar manner. A piece of rock slipped from the roof, struck and broke a safety lamp, the flame becoming exposed and instantly igniting the gas.

Scranton—The Bliss Colliery of the Lackawanna Coal Co., which was tied up for a few days by a button strike, has resumed operations, the members of the union claiming 100 per cent. membership. The Seneca Colliery of the Lehigh Valley Coal Co. has been closed down for a few days for the same cause. It is claimed that a very large proportion of the workmen at the Seneca have failed to ally themselves with the union.

Bituminous

Johnstown—Coal operators are viewing with concern the inroads made in the labor supply of this mining field by the agents of the West Virginia miners. Hundreds of miners brought to this part of the country as raw material and worked into experienced men by the Cambria County operators are being offered inducements by the West Virginia agents and enticed to that field. Thus far no strenuous effort has been made to stay the movement though it is not thought that any attempt in that direction would prove successful.

Cannonsburg—The Henderson Coal Co. has begun the preliminary work of opening a mine on the Montour R.R. There is a large acreage of coal in this vicinity which has not yet been opened. The same company also is clearing off land preparatory to erecting about 100 houses which will be occupied by miners' families. This mine will be one of the largest in the Central Charitiers Valley and will be equipped with modern machinery It is expected to be opened and in operation by next summer. Several other mines will be opened at various points along the new railroad, work on which is progressing steadily.

Patton—The strike of the 800 miners in the Pennsylvania Coal & Coke Corporation mines has been settled. The half dozen or so employees who had been holding out against joining the union have finally been prevailed on to join for the sake of peace, and the men have gone back to work.

Washington—An ejectment suit has been brought by the Reliance Coke Co. against several miners. The trouble between the miners and the company is, it is averred, the outgrowth of a determination to operate nonunion . The men, against whom the suits are brought, refused to work and also refused to give up the company houses in which they are living.

WEST VIRGINIA

Charleston—Fifteen thousand jobs that will pay from $80 to $180 per month depending entirely upon the industry of the men who hold them are waiting applicants at the coal mines in West Virginia. Every coal field in the state is ready to take on more men, and the sooner these men come the better.

A conference was recently held between a committee of miners from the Fairmont coal region and Thomas J. Haggerty, International Board member and President Thomas Cairns of District 17, at which meeting the organization of the Fairmont field was discussed. It was decided to invite the coal operators to meet a committee representing the miners for the purpose of entering into a wage agreement.

Wheeling—A number of coal mines both in this state and on the Ohio side of the river have been forced to suspend operations owing to the scarcity of coal cars. So great has been the demand for coal at Lake ports and other shipping points that the railroads although doing their utmost to meet the emergency are unable to supply sufficient cars. As there is no apparent relief from this situation in sight at present it is likely that many of the mines may be off indefinitely.

TENNESSEE

Knoxville—October 25 has been set as the date for a meeting of representatives of the Kentucky Mine Owners' Association and of the Southern Appalachian coal Operators' Association at Knoxville, to discuss various matters of interest to the operators, including the details of workmen's compensation legislation which will be recommended to the next Kentucky legislature. Kenneth U. Meguire, of Louisville, will probably present to the meeting a tentative draft of an act embodying features desired by the coal interests. It is the object of the coal operators to do what they can toward securing the adoption of an act which will be equally fair to mine owners and miners, and which will be free from the confusion and ambiguity which has resulted in legal entanglements over many acts passed in other states.

KENTUCKY

Pineville—Various rumors regarding the establishment of a large electrical plant, or of several plants, at some point in the vicinity of Pineville, Ky., have been crystalized by the recent purchase of the T. J. Asher plant, which has been leased to the Southern Mining Co. The Kentucky Utilities Co., which has recently acquired numerous other electric plants in Kentucky, is the purchaser, and it is taken for granted that large improvements will be made in the small plant referred to, which has at present one 500 k.w. unit only, for the purpose of enabling the company to take full advantage of the possible market for electricity which is presented by the numerous coal mines in that section.

Madisonville—A picnic held at Madisonville, by the United Mine Workers of America, was largely attended, a parade of more than 2000 miners and their sympathizers being a leading feature. The affair was intended as a demonstration in connection with the work of organizers among the nonunion mines in that section, and was regarded as highly successful from that standpoint. The miners were especially careful to avoid any semblance of disorder, all of the saloons being closed and the proceedings being decorous in every way. It is claimed, however, by several of the larger non-union operators that their men did not attend the picnic, figures being presented showing that the amount of coal loaded out on that day was as large as usual, and larger in some instances.

OHIO

Columbus—The Detroit, Toledo & Ironton R.R. is to be purchased by the bondholders committee, Jan. 20, and to be put in condition to take care of the business of the road. Attorney General Hogan, who threatened ouster proceedings because of insufficiency of equipment received a letter from George P. Johnson, receiver, from Detroit, saying the bond-

holders committee had agreed with Judge Tuttle of the United States district court of Michigan to bid in the road Jan. 20 and to advance sufficient money to keep it going and improve the conditions.

Cadiz—The Selway Coal Co., which was recently granted a charter by the Secretary of State has secured 200 acres of coal land at Rayland. Mining operations have started. D. W. Selway is president.

INDIANA

Brazil—Drillers for coal on the farm of Fred Emmert, four miles south of this city, struck a pocket of gas at a depth of 42 feet.

A keg of powder exploded in a car at the Lost Creek mine, Seeleyville recently. The driver a few feet away escaped injury. The car was attached to the electric locomotive and it is believed a spark from the trolley fell into the can. Several other cans were badly bent and thrown many feet but none exploded. Two trap doors and two brattices were blown in.

ILLINOIS

Marion—At the village election at White Ash, a mining town north of here, the entire Temperance ticket was elected on account of the vote of the miners' wives. About one-half of the votes cast were by women, only a small number of the men voting with the female voters.

West Frankfort—The Burlington R.R. has finally made its connection with the several mines west and south of this place. Heretofore the mines depended upon the Chicago & Eastern Illinois entirely for moving its coal to market.

MISSOURI

Higginsville—There is little probability that a reorganization of the Farmers' Coal Co., operating mines at Higginsville, Mo., will take place, at least during this winter, according to an announcement by Receiver John H. Bovard. Mr. Bovard is now giving his attention to the producing end of the business, and hopes to demonstrate that the mines are fully up to all claims. A daily capacity of 500 tons has been attained, Missouri block coal being mined. The company will probably be put on a more stable basis next spring. It went into the receiver's hands in June.

KANSAS

Lansing—Deputy Warden Fitzgibbon has reported to Governor Hodges that there is a big shortage in the coal production at the state penitentiary at Lansing. The production for the summer was 34,201 bushels less than during the summer of 1912. This is accounted for by the fact that there were less men employed in the mines to the extent of 5456 fewer days work being done.

ARKANSAS

Clarksville—A. P. Hoye formerly of Russellville recently secured a lease on the Eureka Anthracite Coal Co.'s property near Montana. This development has in the past been operated by John E. Daley.

TEXAS

Rockdale—Seven Mexican miners, entombed since Oct. 16 in the Vogel & Lawrence lignite workings here, were found alive Oct. 21, when rescuers gained the mine interior by drilling a ninety-foot shaft. The men were imprisoned by a cave-in following a cloudburst which flooded the mine. Two other men entombed in another part of the mine are believed to be dead.

COLORADO

Crested Butte—The Colorado Fuel & Iron Co. is erecting a model gymnasium for its employees at Crested Butte. This building is to be completed by Dec. 1.

Baldwin—The Citizens' Mine is to be opened shortly after three years of inactivity. Arrangements for opening this operation have already been made and 100 men will be put to work. This will more than double the output of the Baldwin district.

OREGON

Marshfield—A new coal mine has been opened up by Smith & Hennessy on Isthmus Inlet, four miles above the town of Marshfield. It is now producing 50 tons daily, and by Jan. 1, will be turning out 250 tons per day.

Beaver Hill—It is stated that this mine is about worked out, at any rate the Southern Pacific interests, owners are opening up a new mine which will be the main producer. The Beaver Hill has had a steady and large output for years.

Libby Mine—The management of this mine on Coos Bay are now working a double shift and making a record production, as all their coal is contracted for.

PERSONALS

A. B. Kelly, for the past three years superintendent of the Dearth plant of the H. C. Frick Coke Co., has resigned to assume a similar position with the J. H. Hillman Co.

James M. Page, of Pratt City, Ala., has resigned his position as division engineer of Pratt No. 1 Division of the Tennessee Coal, Iron & R.R. Co., to accept the position of superintendent of the Rex No. 2 coal mine of the Lafollette Coal, Iron & Ry. Co. He will be located at Lafollette, Tenn.

John Phillips of Century, Barbour Co., W. Va., has been appointed a district mine inspector, by Chief Earl Henry. He has not yet been assigned to a district. For the past three or four years Mr. Phillips has been general superintendent at the Century Co.'s mine and has acted as manager at other collieries.

A. R. Miller, superintendent of the Leisenring No. 3 plant of the H. C. Frick Coke Co., has tendered his resignation and upon its becoming effective, will become associated in the operations of Francis M. Ritchey, Jr. Mr. Miller will have charge of the physical end of the Ritchey coal and coke operations.

J. M. Webb, foreman for the United States Bureau of Mines, who has been assigned to the Knoxville station has been notified to instruct the miners in the Jellico district in mine rescue work. Four or five teams have already been organized and the coal companies in that locality expect to send more men to learn mine rescue work during the next four or five weeks.

Howard Millington, cashier of the Pittsburg Northern Coal Co., was held up, near Pittsburg, Kan., while carrying the weekly payroll of $6000. The bandits, who proved to be a couple of miners, were repulsed, one being fatally wounded and the other landed in jail. An unusual motive was back of the robbery, one of the miners, two brothers, saying that he needed the money with which to get married.

OBITUARY

John Fallon, prominent for over a decade in the affairs of the United Mine Workers of America, died in Wilkes Barre on Oct. 14, after an illness of but a few days. Peritonitis, following an operation for gall stones, was the cause of his death. For fourteen years Mr. Fallon served in official capacity for the miners. As a member of the national executive board for this district, he had a prominent part in the stirring times of 1902, when as a close associate and confidant of John Mitchell, he was a leader in the great strike conducted by the miners. He is survived by his wife and six children.

CONSTRUCTION NEWS

Benscreek, Penn.—The Juniata Coal Co., of this place, has started work on two fine new mines which will be in operation within the next few months.

Logan, W. Va.—The seven mile extension of the Chesapeake & Ohio up Main Island Creek into the coal and timber land of Cole & Crane, of Cincinnati, is almost completed.

Lehigh, Okla.—The local coal company is now building new bath houses at mines Nos. 1, 5, 6 and 8. When finished, these will be the best in the state; all will have concrete floors, hot and cold shower baths, steam heat, and double rows of lockers.

The company is also preparing to put in a complete telephone system in all the mines. To accomplish this will require 21 miles of wire. A large new boiler, much bigger than ever before used here, is being put in place at mine No. 6.

Radley, Kan.—The Mayer Coal Co. is planning to add two new mines to its present developments. The additional mines will be sunk at Radley Kan., during the next month. The company is in the market for necessary equipment and will operate the new developments throughout the winter.

Johnstown, Penn.—The Berwind Coal Mining Co. has just ordered the erection of 10 more modern houses with all conveniences for miners' families at Mine No. 42. The investment will amount to about $25,000 and will bring the total expenditures of the company for the year up to about $100,000. Plans for extensive building are being drawn up already for next year.

Whitesburg, Ky.—The Elkhorn-Kentucky Coal Co. has been incorporated by Welch, W. Va., parties with a capital of $100,000 for the purpose of developing coal and timber land along Troublesome Creek and Carrs Fork in Knott County. A large area of fine property has been purchased, and it is the intention to induce the Lexington & Eastern R.R. to build at least two branches into the property, and to begin developments early next spring upon a large scale.

Logan, W. Va.—John Laing, ex-chief mine inspector of West Virginia, has recently been elected to the head of a new coal corporation that has under development 27,000 acres of coal land in Logan county, about five miles from Logan. The coal to be developed is known as the Island Creek seam, and 3200 acres will be opened immediately. Two tipples are being erected, each with a capacity of 3000 tons daily. The new firm expects to be able to ship coal by Jan. 1 of the coming year.

Welch, W. Va.—It is understood that the Norfolk & Western expects to double track its Tug Branch line next spring. This improvement will be necessary to care for the ever-growing output of coal in the field which this line serves. The United States Coal & Coke Co., whose mines are located upon this branch, is making great developments, and the coal tonnage is rapidly growing heavier every day. This field is immensely wealthy in coal, and promises to become, in a short time, the heaviest producer of any tributary branch to the Norfolk & Western.

NEW INCORPORATIONS

Houston, Texas—An ammendment has been filed by the Belknap Coal Co. of Witchita Falls decreasing its capital from $200,000 to $50,000.

Marietta, Ohio—The Iron Chest Mining Co., of Marietta, Ohio, has been recently chartered with a capital of $30,000 to engage in all kinds of mining including that of coal.

Indianapolis, Ind.—The Public Fuel Co. is a new concern with $10,000 capital stock, to do a wholesale and retail trade. The directors are A. R. Nicholas, L. E. Kirkpatrick and W. H. Nicholas.

Chicago, Ill.—The Rudenga Coal & Material Co. has been organized in Chicago with a capital stock of $50,000 to deal in and handle all kinds of fuel, building material, etc. The incorporators are William Rudenga, Reider Schoonveld, and John Heck.

Pittsburgh, Penn.—The Coal Bell Co. has been organized at Pittsburgh for the purpose of mining coal, with a capital stock of $600,000. The incorporators are W. B. Beecher, S. B. Kelly, W. H. Young, M. J. Holliday, and George H. Wolf all of Pittsburgh, Penn.

Johnstown, Penn.—The Ajax Coal Co. has been reorganized under the corporate title of the Ajax Consolidated Coal Co. and has increased its capital stock to $275,000. Under the plan of consolidation, the company has taken title to the Fort Hill mine of 300 acres and arranged for the purchase of nearly 1000 additional acres adjoining. The company's mines in Maryland and West Virginia comprise over 900 acres. Richard M. Duvall is president, James B. Pugh, vice-president, Fred E. Rowe, treasurer and Daniel Cloud, secretary.

INDUSTRIAL NEWS

Springfield, Ohio—Fire recently destroyed the round house of the Detroit, Toledo & Ironton Railway Co., causing considerable loss and wrecking two engines.

Earlington, Ky.—The Victoria Coal Co. has, upon the recommendation of its engineer, decided to cease work at its present mines and to open an entirely new operation on its property near Madisonville.

Johnstown, Penn.—Coal operators in this section are becoming alarmed over the scarcity of miners, and they predict that, if they cannot obtain more men to work in the mines, there will be a shortage of coal this winter.

Butler, Penn.—One of the largest coal deals in Butler County, involving 10,000 acres, is to be closed up soon by a syndicate now in the field. The operation will mean the building of several coal towns, and the employing of 1000 miners.

Patton, Penn.—Because eight men refused to unite with the union, 800 employees of the Pennsylvania Coal & Coke Corporation recently went on strike. There is a possibility that the trouble may spread to other operations of this concern in Cambria, Clearfield and Indiana counties.

Johnstown, Penn.—John Lochrie, of Windber, and John Reese, of Scalp Level, purchased the mineral and surface rights of the George Meyers' estate in Solomon Run Hollow, above Walnut Grove, consisting of 30 acres and containing, approximately, 300,000 tons of coal in three seams. Development of the property will be begun at once.

Connellsville, Penn.—The Crescent Coal & Coke Co. has been granted a charter in Delaware and will develop a tract of 122 acres. Steps will be taken at once to operate. For the present the company expects to take out the coal and will not engage in the manufacture of coke. If conditions warrant, a battery of coke ovens will be built later.

Toledo, Ohio—The Toledo Fuel Co. has moved from the former location on St. Clair St. into handsome new quarters in Toledo's new skyscraper, the 22-story building of the Second National Bank. This building is the tallest in the city and being of rather small ground dimensions, is quote noticeable. It overlooks the Maumee River and all the big docks and railroad yards in that section of the city.

Princeton, W. Va.—A new set of scales being built by the Virginian R.R., at Princeton, is said to be the only equipment of its kind used by any railroad in the United States. These scales are of two-car capacity, devised with double platforms working independently of each other, and the tonnage of both cars is registered on the inside of the scale house. This expedites the weighing of a train of coal to such an extent that it can be performed in less than half the time required by the one-car scales.

Wilmington, Del.—The United States Coal Co. which was incorporated under the laws of Delaware, in 1910, recently held a meeting at Wilmington, for the purpose of electing a board of directors. This company's coal property consists of 2280 acres situated about four miles southwest of Kemmerer, Lincoln County, Wyo., on the tracks of the Oregon Short Line R.R. The property is underlaid with 11 seams of bituminous coal aggregating 210 ft. in thickness. Reliable engineers estimate that the property contains 478,000,000 tons of marketable fuel.

Baltimore, Md.—To supply the increased demand for its products, the Davis Coal & Coke Co. is opening an additional mine at Franklin, West Va. This will become a part of the lower Potomac branch of the company. No statement is made as to what the tonnage will be. Simultaneously, the same firm is enlarging its mines at Henry, W. Va., so as to double the output, thus giving a daily output of about 1000 tons. The electric power used in connection with these operations will be furnished by the company's central power plant at Thomas, W. Va.

Pineville, Ky.—The Cumberland Telegraph & Telephone Co., in response to the repeated requests and petitions of coal operators and business men in the Harlan field, has announced that it will construct long-distance lines to Harlan and points in that vicinity as soon as possible. This section has heretofore been practically cut off, as far as telephone communication is concerned, by the fact that the Cumberland lines did not go further than Pineville. It is probable that the work of constructing the necessary new lines will begin in the spring, as the winter months are not favorable to that work.

St. Louis, Mo.—Before Commissioner Harlan, of the Interstate Commerce Commission, in Chicago, has come up the hearing of the Business Mens' League, of St. Louis, vs. the St. Louis Terminal Association for the removal of the twenty cents per ton bridge toll on coal for St. Louis.

A large delegation of St. Louis business men and manufacturers are fighting against the toll and the business interests of East St. Louis are lined up with the Terminal, fearing that the roads may be able to prove that the rate to East St. Louis is not a paying one in the event that the bridge toll is removed.

Upon the outcome of this contest depends the future of the manufacturing enterprises on the east side of the Mississippi River, and to some extent the development of St. Louis proper on the other hand. This is the first time that the St. Louis bridge toll question has got to a hearing before the Commission, the Terminal having always been successful in getting the proposed hearings blocked.

COAL TRADE REVIEWS

GENERAL REVIEW

An abrupt and general decline in temperature, in all parts of the country, checked a weakening tendency in the market. Anthracite stimulated into activity. Bituminous feeling the effects of the uncertainty in the business outlook and the continued heavy movement.

The week opened with a general storm in all parts of the country, accompanied by a sharp fall in temperature which arrived at the crucial moment. Under the combined influence of unseasonable weather conditions and a heavy production at the mines, the broadening tendency of the market had suffered a check, and the trade was beginning to mark time pending further developments. While prices were being well sustained, there was a notable contraction in the absorbing power of the market; activity was confined more closely to the higher grades, and the fact that a number of these were being offered in the outside markets was significant evidence of the trend of conditions. There has been no potential disturbance in the week's developments, and with the added stimulus of the changed weather conditions the strong latent power, which has been the distinguishing characteristic of the market for the past two months, will be revived.

The anthracite trade is momentarily dormant, but with a strong undertone. The last rush is on to the Atlantic Coast ports which close to navigation, and the trade only needs the reviving influence of colder weather to start the usual winter activity.

There is less anxiety apparent in the Eastern bituminous situation; stocks are said to be larger than usual, and no shortage is anticipated provided the car supply remains moderately good. Consumers are showing a tendency to go slower because of the decrease in industrial activity, particularly in the iron and steel lines, and the uncertainty in the business outlook generally. Production is restricted, however, by car and labor shortages, so that the market will probably continue on the same firm basis until the closing of navigation on the Lakes, at least.

Advanced circulars have been announced by most of the operators in Ohio, and the new quotations are being well maintained by slow deliveries which show indications of becoming even worse. The dumpings over the Hampton Road piers are heavy, both plenty of vessels and coal being available; the piers are working practically continuous. The southern markets continue rather quiet.

The effects of the changed weather conditions, which were particularly severe in the Mississippi Valley, are not available at this writing. They will no doubt have a material influence upon the situation there. The car shortage is not as bad as was anticipated, and the market has been holding steady with the possible exception of the steam grades. The supplies on the docks at the head of the Lakes are heavy, but it is conservatively estimated that the movement to the interior has been 25 per cent. less up to Oct. 1 of this year than last year.

BOSTON, MASS.

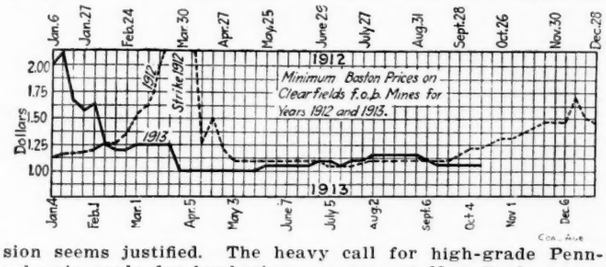
An easier situation on Pocahontas and New River, with the outlook doubtful. Shipments of Georges Creek from Philadelphia another sign of a relaxed market. Bunkering demand at New York holds prices, on the better Pennsylvania grades about where they have been for several weeks. The poorer grades are off. Anthracite continues strong.

Bituminous—Whether due to a slackening demand or purely to the slow movement of water transportation, supplies of Pocahontas and New River are notably easier than a week ago. The loading dispatch at Hampton Roads has improved and tonnage is being freely accepted for the balance of the month. With some of the agencies, too, there has been a recession in price so that $2.85 is again heard in scattered instances for spot coal. This is the more surprising when recent heavy consignments for the Government and an active demand for export are both taken into account.

Whether the market will get firmer again when transportation gets moving regularly, remains to be seen. There is apparently no anxiety in New England over coal for November except in the relatively few cases where navigation will close soon after Dec. 1. Stocks are understood to be larger than normal in most directions and anything approaching a "flurry" is now hardly possible unless a really serious car shortage develops in the next month or two. A scarcity of mine-workers is still reported from West Virginia but output seems to be kept up to the usual mark for this time of year.

For inland shipments there is very light demand and distributors with cargo balances to dispose of find the going rather hard. Prices are off somewhat in consequence.

Georges Creek has been available on contract requisitions at Philadelphia this week, the first invoices there of this grade for coastwise shipment since late August. That is another factor in the general easing up that is evident all along the line. There are a number of shippers who are quietly looking around for small orders to relieve a possible pressure of coal later and in many ways their apprehension seems justified. The heavy call for high-grade Pennsylvania coals for bunkering purposes at New York, transatlantic business especially, is holding prices up to the level that has prevailed now for several weeks. The poor grades however, are selling pretty well down and the increasing differential between "good" and "poor" is one of the interesting developments of 1913.



Anthracite—The situation is quite as strong as when last reported. Interruptions to barge movement have caused a rather sharpened demand for prompt cargoes. The last rush for shipments east to the Penobscot and the Kennebec taken together with urgent calls from the larger cities make a situation that grows harder to manage as the season advances.

Quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*	$1.05@1.65	$1.30@1.75	$1.67@1.77	
Philadelphia*	2.30@2.90	2.55@3.00	2.92@3.02	
New York*	2.60@3.20	2.85@3.30	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				$2.85@2.95
Providence†				3.73@3.88
Boston†				3.83@8.93

*F.o.b. †On cars.

NEW YORK

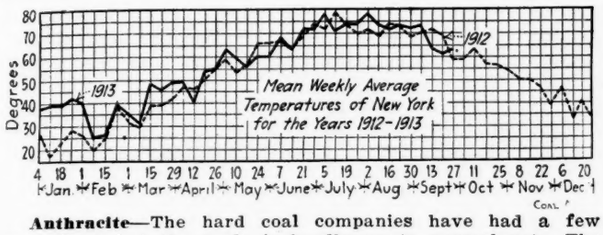
More seasonable weather has had a stimulating influence upon both branches of the local trade. Stove continues the shortest in supply with steam grades all fairly long. Bituminous moving freely but the general tone is not so assured.

Bituminous—There is a notable feeling of hesitancy in the local soft-coal market. Prices are nominally stronger at the moment than last week, but the market seems to have encountered unexpected cross currents, and the general tone is by no means so assured. The trouble is ascribed to a variety of causes; the main difficulty seems to be in the currency legislation. It is even rumored in some places that pressure is being exerted on the market by large interests for the purpose of creating adverse sentiment regarding the new laws.

Despite these unfavorable factors, coal continues to move freely and the local supplies are temporarily reported at an unusually low point. Production for the current month seems to be falling behind both the preceding two months; this is not due to the lack of orders, but to the inadequate car supply and labor troubles in the mining regions. This latter phase of the situation is becoming more accentuated and operators are inclined to a pessimistic view of the outlook. The trouble is not so much in obtaining men, as in the difficulty of keeping them at work.

There is little doing in contracting, and those who have not already covered their requirements probably will not do so this season. We continue quoting the New York market on approximately the following basis:

West Virginia steam, $2.60@2.65; fair grades of Pennsylvania, $2.70@2.75; good grades of Pennsylvania, $2.80@2.85; best Miller Pennsylvania, $3.10@3.20; George's Creek, $3.15@3.25.


Degrees
80
70
60
50
40
30
20
1913
1912
Mean Weekly Average Temperatures of New York for the Years 1912-1913
4 18 1 15 1 15 29 12 26 10 24 7 21 5 19 2 16 30 13 27 11 25 8 22 6 20
Jan. Feb Mar April May June July Aug Sept Oct Nov Dec
COAL

Anthracite—The hard coal companies have had a few good days, but the trade is hardly up to normal yet. The appearance of more seasonable weather the early part of the week had a stimulating affect upon the retail branch of the market, but on the other hand, the big wholesalers have had orders cancelled by the dealers, and complaints of slow business are general. The heaviest trade of the year normally develops in October, but such is not the case the current year. Although it is conservatively estimated that the difference in consumption between a hard and easy winter in New York does not exceed 10%, the local agencies seem to be agreed that the situation is now hinging entirely upon the weather.

In the prepared sizes, stove continues the leader, with egg and broken rather weak; nut is easy, but can be moved with stove. The lower grade steam sizes are nearly all in long supply, with the possible exception of No. 2 buckwheat, which is rather short.

We quote the New York hard-coal market moderately firm, according to weather conditions, on about the following basis:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	.....	$4.95	$4.95
Egg	5.25	$5.15@5.25	5.20	5.10@5.20
Stove	5.25	5.25@5.50	5.20	5.20@5.45
Chestnut	5.50	5.50	5.45	5.40@5.45
Pea	3.50	3.35@3.50	3.45	3.30@3.45
Buckwheat	2.75	2.65@2.75	2.45@2.70	2.00@2.70
Rice	2.25	2.25@2.35	1.95@2.20	1.60@2.20
Barley	1.75	1.70	1.50	1.50@1.70

PHILADELPHIA

Anthracite inactive pending the arrival of more seasonable weather. Supplies adequate. Uncertainty over the new Pennsylvania state tax.

Local anthracite dealers are waiting anxiously for the appearance of cold weather. During the past week the volume of business increased, but failed to equal that of a year ago. Reports from the mines state that the production this month will be larger than in September and the consumption of coal will be greater. Stove coal is reported scarce and has been sold at a premium. Egg has not been active in the local market contrary to expectations. During the week there was some cutting of prices. It is thought here that the trade will not be embarrassed for coal this winter as was the case last year.

There have been many complaints from the retail dealers in anthracite coal over the state tax on all anthracite mined in Pennsylvania. Many dealers declare that they lose 10 and 12c. on every ton they sell. A year ago they were making more money than at the present time, they assert. It is said that a number of the dealers are going to organize and make the consumer pay the additional 10c. per ton. Several large companies have already announced their intention of levying the extra charge next month.

With the circular at $7.25 a ton for nut, stove $7, egg $6.75 and pea $5.25, the market is more nearly quotable at $7.35 for nut, $7.10 for stove and $6.85 for egg coal. Only the arrival of cold weather will create an active market. Wholesalers report increased demand although retail dealers assert they have had few inquiries worth while during the past week.

BALTIMORE, MD.

Trade conditions remain excellent. Predictions of a drop in the market are again delayed. Demand strong for all classes of fuel and consumers are showing more and more anxiety to get under cover.

The better grades of coal are quickly taken up as offered. Producing interests are being forced to refuse to ship any excess fuel on contracts, and for this reason a number of concerns who have wanted coal above their usual weekly or monthly allotment have been forced to the open market. The heavy call from the Lakes keeps up, and for the present at least there seems to be no disturbing element in sight. West Virginia coals, even of medium grade are easily commanding from $1.05 to $1.15, and three-quarter, is good for $1.20. The Pennsylvania steam coals are worth from $1.15 to $1.25 for the least desirable grades, and better coals are reported farther out of the market now than for many seasons past at this time of the year. Cars were short on certain days in both the Fairmont and Somerset districts. The trouble was not as acute as some time back, but is still an uncertain feature.

Announcement of a new freight tariff from the mines to Baltimore was made by the Baltimore & Ohio R.R. this week. Eight cents is added to the all-rail rate to Baltimore and inside the Virginia Capes deliveries through this city, while seven cents is added to the tariff on both coastwise and foreign shipments outside the Capes.

The anthracite business here is normal for the season. No great rush is to be expected until real cold weather sets in, and in the meantime a fair delivery is being made for the household trade, gaps in yards being filled easily under a steady movement from mines to the city.

PITTSBURGH, PENN.

Car supply poorer, restricting production. Demand less than expected, but easily absorbing current production; recently advanced prices maintained. Temporary weakening expected at close of lake shipping season. Connellsville coke dull, but not particularly weak.

Bituminous—The car supply has decreased somewhat in the past week and is decidedly inadequate at the majority of mines. It is commonly accepted that there has been a slight decrease at least in general industrial activity, and that otherwise the car shortage in the coal industry at present would be greater. Demand for coal has not improved as much as expected, consumers showing a tendency to go slow on account of the general business outlook which, particularly in iron and steel, is not as bright as it was. With lake shipments very heavy and production somewhat restricted by car and labor shortage there is room for all the coal mined, and more, so that the recently advanced prices are secured without much difficulty for such limited tonnages of free coal as are available.

It is not improbable that there will be a little slump in the market when the lake shipping season closes, but operators expect this to be of brief duration at most; consumers are all imbued with the idea that there will be an unusually long suspension next year at the time of the biennial wage adjustment, and stocking against this contingency is expected to steady the market eventually.

We quote for prompt and near forward delivery the advanced prices announced Oct. 1: Slack, $1@1.25; mine-run, $1.40@1.50; ¾-in., $1.50@1.60; 1¼-in., $1.65@1.75, per ton at mine, Pittsburgh district.

Connellsville Coke—The market continues extremely quiet, but prices are not without some firmness, particularly when strictly standard coke is required. For instance, it is understood that a furnace interest which only buys on exceptionally rigid specifications has made a number of purchases of prompt furnace in the past fortnight at $2.25. November requirements yet to be filled are not large, and interest in the market now centers upon price prospects on contracts to be made for 1914. While a large number of operators, probably representing about two-thirds of the total merchant output, are understood to be committed to a price of $2.50; consumers appear firm in the belief that they will be able to cover at not much if any above $2. We quote the market largely nominal at present: Prompt furnace, $2.15@2.25; contract furnace, $2.25@2.50; prompt foundry, $2.75@3; contract foundry, $2.75@3, per ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Oct. 11, at 386,890 tons, an increase of 28,592 tons, and shipments at 386,890 tons, a decrease of 3055 tons.

TOLEDO, OHIO

Demand for domestic grades curtailed by warm weather. Car shortage the feature of the market. Transportation problem becoming steadily serious. Lake shipping continues heavy

The recent warm weather has put something of a damper on the demand for domestic coal. However the real difficulty of the situation here is the car shortage. Few dealers are receiving anything like normal shipments and this is especially true of the Pennsylvania field. Coal is also difficult to get from the southern Ohio fields. The alarming thing about the whole situation is that conditions seem to be growing worse instead of better. Railroads do not deny that cars are scarce and say that this will continue for about 90 days. There seems to be a shortage of motive power rather than an actual scarcity of cars.

Lake shipping continues as active as possible under the

circumstances but many more boats would be loaded at the Toledo docks if coal supplies could be secured. During the present month there has been about 905,634 tons of coal sent up the lakes from the Toledo docks. There have of late been some unverified rumors of embargoes on some of the local railroads and it is feared that a little bad weather would tie the coal market up in had shape. Prices are holding firm and there are practically no offers below the list.

DULUTH—SUPERIOR

W. W. Broughton, of Minneapolis, vice-president of the Pittsburg Coal Co., and one of the best traffic men in this country, comments on the coal situation at the head of the lakes as follows:

"The country is short and the Duluth-Superior docks long on coal supplies, and as a result we shall see less than the average tonnage on the docks Dec. 1. To look at the docks one would be impressed that there is a large supply, but much of this should be in the yards of the country coal dealer, and in the bins of consumers, at this time, to make room on the docks for additional supplies to meet the winter demand. We will go into the winter with a larger demand for coal, and only a normal supply, or less, to meet it. Last season there was a free movement to the interior with the result that we had sufficient coal on docks to meet the winter demands. The movement to the interior this season to Oct. 1, has been less by 25 to 30% than a year ago for the corresponding period."

COLUMBUS, OHIO

Many of the operators in the Ohio district have announced an advance in quotations effective, Oct. 20 and others are expected to follow; as a result the price levels are considerably higher in the face of rather unfavorable weather. Car shortage continues severe.

The feature of the coal trade during the past week was the announcement by a number of operators of an advance in the circular, effective Oct. 20. Others are expected to follow suit and all will probably be asking higher quotations by Nov. 1 if not sooner. While the warm weather has not been the best for the trade, still the congested condition was only partially relieved and the demand still continues insistent.

The new circular issued by some of the Hocking Valley operators provides for an advance in domestic lump to $2 and three-quarter inch to $1.75 to $1.85. Other grades have also been increased. These prices are expected to be maintained because of the shortage of equipment which delays deliveries to a large extent. In fact very few shipments are going through to their destination promptly.

Lake demand is still good although the shortage of equipment is having its effect on the tonnage moving to the Northwest. Dockmen at the upper Lake ports are asking for as large a tonnage as possible before the winter weather closes navigation. Dock prices are still strong and no weakness of any sort has appeared. Interior movement is good although reports show that the car shortage is prevelent in that section also.

Manufacturing plants are running along steadily as far as their fuel requirements are concerned. Many are ordering a larger tonnage although no especial effort is being made to accumulate a surplus to take care of the plant in case of a marked car stringency.

Dealers demands are steady in all of the Ohio markets. While retail business has been adversely affected by the higher temperatures, still orders to the operator and jobber are up to the mark for the time of the year. Reports from the mining districts indicate a car supply of between 55 and 65% and those figures show the output as compared with normal. In Eastern Ohio the shortage is very marked and the production is believed to be but 50%. The Hocking Valley is the best off as far as car supply is concerned.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump	$2.00@1.90	.....	$2.00@1.90	$1.75@1.70
3-4 inch	1.85@1.75	$1.50@1.40	1.85@1.75	1.55@1.50
Nut	1.30@1.20	.....	1.60@1.55	1.25@1.20
Mine-run	1.50@1.40	1.30@1.25	1.50@1.40	1.25@1.20
Nut, pea and slack	0.90@0.85	.....	1.00@0.90	0.85@0.80
Coarse slack	0.80@0.75	1.00@0.95	0.90@0.80	0.70@0.65

HAMPTON ROADS, VA.

Loadings at piers fairly heavy. Virginian Railway breaks all previous records at Hampton Roads for fast loading. Prices firm on all grades.

The movement from Hampton Roads during the week was heavy. There was a good supply of coal with an ample number of vessels arriving which kept all piers working continuously practically all week. The heaviest shipments have as usual been made to the New Englnd market although there have been a number of large cargoes loaded for foreign ports. Quite a fleet of bunker steamers have also been taken care of.

Prices on all grades have remained firm with a good demand for New River and Pocahontas mine run. Inquiry has not been so heavy, however, for the high volatile coals.

Record time was made by the Virginian Ry. at Sewalls Point on Oct. 17 when they loaded the steamer "Melrose" with 7238 tons of cargo and 238 tons of bunker coal in five hours. A total of 157 cars of coal were loaded which made an average of 31⅘ cars dumped per hour. The coal loaded was supplied by the Chesapeake & Ohio Coal & Coke Co. and was consigned to Everett, Mass.

LOUISVILLE, KY.

Operations in the eastern Kentucky field seriously restricted by the inadequate car supply. Western Kentucky better fixed in this respect. A large shortage of river coals due to the low water.

While the abnormally warm weather is giving way to something of a more seasonable character, the coal men are not much cheered over the prospects, because of the poor car supply. As a matter of fact, the light demand for domestic grades has been rather a relief than otherwise. Because of the poor supply of equipment the eastern Kentucky operators have been able to work on only about half time. Operators generally in all parts of the state are perplexed to know how the situation will be handled when the heavy winter demand opens up.

Because of the low stage of water in the river there is an almost acute shortage of the river coals at Louisville. The supply is practically exhausted at the moment, which is a most unusual situation at this period of the year. It is stated in some quarters that consumers demanding the Pittsburgh products are being furnished with Straight Creek and other eastern Kentucky coals. If the car supply continues short in that district the operators there will be pushed to meet their own requirements, so that any surplus demand will have to be furnished by the western Kentucky producers.

The better grade eastern Kentucky block coal is selling up to $2.50 f.o.b. mines, with the others ranging down to a minimum of $2.25 for the large sizes of good coal. Contracts may be negotiated at the low point, but sales for prompt delivery are more likely to bring the higher figure. Good grades of nut and slack from the eastern part of the state are quotable at 70@80c., with the second grades at from 50@60c. a ton, f.o.b. mines; western Kentucky screenings are at a very low point.

BIRMINGHAM, ALA.

Steam and domestic coals quiet with blacksmith about normal. Little doing in furnace or foundry coke except in small lots. Pig iron quiet, with small buying for next year. Railroad commission or Alabama takes a hand in the car shortage.

The market on both steam and domestic coal has assumed a rather stagnant condition; while fairly good, it is not up to the normal for this season, due to the continued warm weather, and the large output. A little cool weather will bring a decided change for the better on both grades. Blacksmith coal is in fair demand, with sales slightly over last week. Due to the number of furnaces out of blast undergoing needed repairs, there is a surplus of furnace coke for the time being, and several of the large companies have curtailed production. There have been some sales of fair tonnage at satisfactory prices. Foundry coke is in demand in small quantities, no large contracts being made.

Pig iron is quiet, and although numerous small sales in quantities of 100 to 500 tons are being made for the balance of this year, little tonnage was booked for next year, during the past ten days.

The car shortage continues serious on some roads, while others have improved to some extent. The Southern Railroad is causing the most trouble at the present time, mines on that line running only about three or four days in the week. due to lack of cars. The Alabama State Railroad Commission has just issued a letter giving advice to shippers and railroads in regard to quick handling of empties and loads; it is hoped that this will have some good effect, on both the railroads and the shippers, and increase the car supply during the next three or four months.

NEW ORLEANS

Domestic and harbor demands contribute to activity. Up-river companies' stocks low and an early rise will be necessary to save an embarassing situation.

Domestic demand opened strong last week and the delivery departments of the different agencies were kept busy.

Orders from the towns and cities in this territory came in large volume, almost invariably marked "rush." Cotton began to move in earnest and the demand from the waterfront was heavier than has been the case in some time.

Much concern is being felt by the Pennsylvania and other up-river companies' agencies. Stocks are forty per cent. below the average figure for this time of the year and business is heavier than ever before. An early rise in the river will save an embarassing situation but should this be delayed as late as some years the Alabama interests will have to be called upon to fill out contracts. Such a situation would be interesting, to say the least, considering the feeling that exists, and probably would result in the exacting of a profit that would be limited only by the cost of rail transportation from Pittsburgh.

INDIANAPOLIS

Warm weather the first half of the month cut down both the domestic and steam trade but conditions are better now. The railroads are relieving congestion at junction points and giving improved service at the mines. Prices hold strong. Screenings have advanced from their low point.

The first half of October did not produce as much business for Indiana coal operators as the last half of September, due principally to the warm weather which cut down the quantity of coal required for steam purposes. The second half of October is giving something more like seasonable weather and the trade expects the month as a whole to show up more normal.

The continued mild weather resulted in finally relieving the car trouble to the extent that it is only bad in spots now but production is still restricted to 75 to 85 per cent. of normal. It is said in extenuation of the railroads that much money was spent on making good the losses of the March floods, and they are further handicapped by the lack of borrowing facilities in the financial market, due to circumstances over which they have no control. There is much complaint about the Chicago & Eastern Illinois and roads that bring Ohio coal into this state.

Prices are strong except on screenings, though these have improved, ranging from 50@65c. f.o.b. mines, as compared with 30@50c. a short time ago. Bituminous lump commands $1.60@1.85, with the top price higher on urgent orders. Mine run is $1.10@1.15; nut and egg, $1.30@1.50; washed coal, $1.65@1.75; Brazil block, $2.25@2.40. The immediate market is regarded largely as a weather one. Retail prices in this city remain at the advanced figures of Sept. 20.

CHICAGO

Heavy buying orders for various grades still coming in. The movement of splint coal to this market unusually heavy. Steam grades somewhat unsteady, but prices are at a satisfactory level. The demand for Hocking is strong. Prices for coke have not been altered.

Despite Indian summer weather there has been little recession in the strong demand for various grades of coal. Orders for anthracite are plentiful and chestnut is a trifle scarce. Although shipments have been heavy, the volume of orders has been in excess of receipts and a number of dealers are looking forward to premium prices. There has been an increase in the movement of splint coal and quotations range between $1.75@1.85. Although there has been some decrease in the buying of coke, prices remain firm. A number of Springfield operators are attempting to obtain $2 a ton for domestic lump, but, as a rule, $1.75 is the market.

Buying of steam coal has been somewhat unsteady and prices, after a decline of 15c. a ton, have returned to the basis of two weeks ago. Many mines still have a large amount of low-priced orders for screenings on hand. On mine-run the majority of Western operators are averaging $1.10@1.15 a ton. Smokeless lump and egg prices range from $2.25@2.50. Many orders are being received for smokeless mine-run, small lots selling at $1.50 and larger orders at $1.40..

Carterville operators are selling lump, egg and No. 1 washed at $2, the mines; No. 1 washed is given the preference over either lump or egg. The demand for Hockirg coal continues steady and prices are firm. Quotations by Franklin County producers for lump and egg vary from $2@2.25, the mines.

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.57	$3.05@3.30	$2.52	
Steam lump	2.07		2.07	
Egg		3.05@3.30		$4.30@4.45
Mine-run	1.92	2.40@2.55	1.87	3.45@3.55
Screenings	1.12@1.22	1.55@1.80	1.12@1.22	

Coke—Connellsville, $5.50; Wise County, $5.25@5.50; by-product, egg, stove and nut, $4.85; gas house, $4.65@4.75.

DETROIT, MICH.

Warm weather and approaching end of the Lake shipping season is having a depressing effect on the soft-coal market. Car shortage becoming more evident. Domestic coals and better grades generally continue strong.

Bituminous—A slight slump has been noticed in soft coal, and the situation is uncertain at the moment. There has been a distinct falling off in the demand during the week, and the near approach of the closing of the lake shipping season is having an undeniably depressing effect upon the immediate outlook locally. However, the slump seems to center around the low-grade West Virginias, the better qualities holding firm, with a few spot sales being negotiated on the basis of $1.10 for mine-run.

The bituminous market is now quotable on about the following basis:

	W. Va. Splint	Gas	Hocking	Cambridge	No. 8 Ohio	Pocahontas	Jackson Hill
Domestic lump	$1.75	....	....	....	....	$2.75	$2.50
Egg	1.75	....	....	....	....	2.75	2.50
Nut	1.35	....	....	....	....	....	....
Steam lump	1.50	....	....	....	....	....	....
¾-in. lump	1.15	$1.15	$1.10	1.10	1.10	....	....
Mine-run	1.05	1.05	1.00	1.05	1.05	....	....
Slack	0.75	0.90	0.75	0.80	0.80	....	....

Anthracite—Because of the unseasonably warm weather the situation in hard coal is rather disappointing at the moment. The trade is in fair shape, however, and the advent of cold weather will certainly create some activity. The general tendency seems to be to store liberally in anticipation of a rather severe winter.

ST. LOUIS

Market conditions looking better the present week. Car shortage still continues, and the steam market seems to have no foundation. Conditions bad in general, with a supply that exceeds the demand.

The present week brought about a better condition in the coal trade, but only to a slight extent. The trade became demoralized last week because of the warm weather and the forcing of the market on several sizes from the different fields. Some mines are sold up on lump and have no market for the other sizes; others have taken no advance orders at all in hopes that the market would go up. The result has been that with every additional day's work there is more coal forced on the market than there is a demand for.

This applies especially to the Carterville and Franklin County fields. In the Standard field, coal is still going at the cost of production or less, and several mines have shut down until the market gets better. This shows what a demoralized coal market the St. Louis operators are playing to when, at this season, they cannot get cost of production.

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump	.....	.....	.....	$1.05@1.15
3-in. lump	.....	.....	$1.50	.....
6-in. lump	$1.65 @ 1.85	.....	1.60	1.30@1.40
Lump and egg	1.50 @ 1.60	$2.25	.....	.....
No. 1 nut	1.25 @ 1.50	.....	.....	.....
Screenings	0.45 @ 0.50	.....	.....	1.10@1.20
Mine-run	.....	.....	.....	0.90
No. 1 washed nut	1.65 @ 1.85	.....	1.40	.....
No. 2 washed nut	1.30 @ 1.45	.....	1.60	.....
No. 3 washed nut	1.15 @ 1.20	.....	.....	.....
No. 4 washed nut	1.05 @ 1.15	.....	.....	.....
No. 5 washed nut	0.35 @ 0.40	.....	.....	.....

Anthracite—Quotations f.o.b. St. Louis are: Chestnut, $7.54; egg and stove, $7.27; grate, $7.01.

Coke—Gas house is quoted at $4.50@4.75, and byproduct at $4.85@5, both f.o.b. St. Louis.

KANSAS CITY, MO.

Market stiff with an advance likely. Larger sizes of steam coal, slow. Other movement good. Car shortage still interfering.

Demand is brisk and practically all lines are moving nicely. A possible exception may be the larger sizes of steam coal. However, a little snappy weather will give impetus to the marketing of these grades. The ideal weather which has prevailed for the past month has come to an abrupt end and the indications now are for the beginning of winter. Cooler weather already has arrived and a continuation will probably result in another 25c. advance. This is likely to take place about Nov. 1.

Prices are the same as those of a week ago, Kansas deep shaft fancy lump being held at $2.50; Arkansas Russellville anthracite grate, $4.35; Missouri Richmond and Camden block, $2.25 and Iowa Mystic and Centerville block, $2.25. All quotations are f.o.b. mines.

OGDEN, UTAH

Demand exceeds production. Colder weather causes increased demand for lump and nut. Sugar factories consuming surplus of slack and steam coal. Strike of the Colorado miners causing shortage there and in Nebraska. Car shortage at Wyoming mines.

All of the mines are now receiving plenty of orders to take care of the full production and many of the operations are even getting behind on shipments. Colder weather throughout the territory is the general cause. This has enabled the operators to force the market demand for nut coal and the surplus of this grade has been moved.

The sugar factories are all running full time, and are consuming all the steam and slack coal produced. The strike in Colorado has caused a heavy demand for Rock Springs coal in Colorado and Nebraska; winter is approaching rapidly in these two states, and it is evident that they will have quite a shortage.

The Wyoming mines were visited by a car shortage this week and several of the operations lost two days on this account. However it is not expected that this will continue for any length of time as there are plenty of cars en route.

On Oct. 13 quotations for shipment in Nevada advanced to: Lump, $3; nut, $2.50; mine-run, $1.85; slack, $1. For the balance of the territory the quotations are: Lump, $2.75; nut, $2.25; mine-run, $1.85; slack, $1.

PORTLAND, ORE.

Small shipments from Australia this fall may effect prices to some extent. Elimination of duty will not have any extensive bearing on situation.

The sailing schooner "George E. Billings" arrived in the Columbia River this week from Australia with a cargo of coal of about 1500 tons, part of which was discharged at Astoria and the remainder will be brought to Portland. This is the first water shipment received here since early last spring. It was announced today that a second shipment of about 1500 tons will arrive in a couple of months.

General indications here are that there will be a scarcity of coal in this market during the winter and retail dealers are notifying customers accordingly. The weather so far has been mild in the western part of the state, but snow fell in the eastern sections during the week. Receipts of coal are rather light for the present owing to the difficulty in getting cars promptly.

FOREIGN MARKETS

GREAT BRITAIN

Oct. 10—Steam-coal market conditions are not materially changed. A good demand continuing for admiralty list coals, while inferior classes are plentiful and prices on the easy side.

Best Welsh steam	$4.58@4.80	Best Monmouthshires	$3.84@4.08
Best seconds	4.44@4.56	Seconds	3.78@3.90
Seconds	4.20@4.32	Best Cardiff smalls	2.46@2.58
Best dry coals	4.32@4.56	Seconds	2.28@2.40

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both net, exclusive of wharfage, and for cash in 30 days.

PRODUCTION AND TRANSPORTATION STATISTICS

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for August and the two months ending Aug. 31, 1913, in short tons:

	August		2 Months			
Destination	1913	1912	1913	%	1912	%
Tidewater	319,616	356,296	558,254	18	644,989	22
East	172,249	200,216	364,040	12	364,964	12
West	1,066,671	975,301	1,933,543	63	1,907,186	65
Total	1,558,536	1,531,813	2,855,837		2,917,139	
Coke	26,723	22,082	56,668		42,058	
From connections						
Bituminous	106,980	21,079	200,391	7	36,620	1
Anthracite	1,642	808	3,213		1,597	
Total (except coke)	1,667,167	1,553,700	3,059,441	100	2,955,356	100

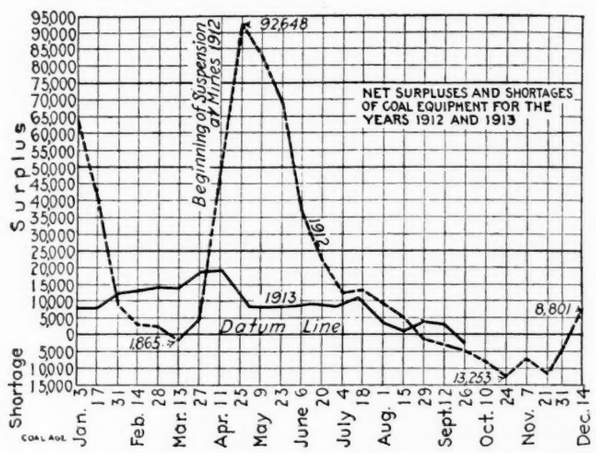
THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended Oct. 1, as follows:

	Surplus	Shortage	Net*
New England Lines	0	100	100
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	748	950	202
Ohio; Indiana; Michigan; Western Pennsylvania	300	2,103	1,803
West Virginia, Virginia, North & South Carolina	859	4,573	3,714
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	265	628	363
Iowa, Illinois, Wis., Minn.; North & South Dakota	1,064	857	**207**
Montana, Wyoming, Nebraska	544	0	**544**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	1,451	216	**1,235**
Texas, Louisiana, New Mexico	476	4	**472**
Oregon, Idaho, California, Arizona	2,226	70	**2,156**
Canadian Lines	20	892	872
Total	7,953	10,393	2,440

	May 15	June 14	June 30	July 15	Aug. 1	Aug. 15	Sept. 1	Sept. 15
Surplus	12,267	11,098	11,055	13,203	8,810	8,293	8,689	8,714
Shortage	4,226	2,033	2,821	1,826	4,029	7,038	5,209	7,731
Net*	**8,041**	**9,065**	**8,234**	**12,377**	**4,781**	**1,255**	**3,480**	**983**

***Bold face** type indicates a surplus.



COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending Oct. 18.

Stocks	Week's Range High	Week's Range Low	Week's Range Last	Year's Range High	Year's Range Low
American Coal Products	84	84	84	87	80
American Coal Products Pref.	102	100½	100½	109½	105
Colorado Fuel & Iron	29	28	28	41½	24½
Colorado Fuel & Iron Pref.	....	....	155	155	150
Consolidation Coal of Maryland	....	....	102½	102½	102½
Lehigh Valley Coal Sales	210	200	210	....	....
Island Creek Coal Com	51	49½	49½	53½	47½
Island Creek Coal Pref.	84	83½	83½	85	80
Pittsburgh Coal	21⅜	19⅜	21	24⅜	14½
Pittsburgh Coal Pref.	90¼	88½	90	95	73
Pond Creek	21	19	19	23¾	16½
Reading	166	160¾	160¾	171	151⅜
Reading 1st Pref.	85	84¾	84¾	92½	82½
Reading 2nd Pref.	..	..	91	95	84
Virginia Iron, Coal & Coke	43	43	43	54	37

Bonds	Closing Bid	Closing Asked	Week's Range or Last Sale	Year's Range	
Colo. F. & I. gen. s.f.g. 5s	95	98	98 Sept. '13	93½	99½
Colo. F. & I. gen. 6s	104	104½	107½ June '12	..	..
Col. Ind. 1st & coll. 5s. gu	80	Sale	80 80½	77½	85
Cons. Ind. Coal Me. 1st 5s	..	..	76 Aug. '13	76	76
Cons. Coal 1st and ref. 5s	..	92⅛	93 Oct. '12	..	..
Gr. Riv. Coal & C. 1st g 6s	..	..	102¼ April '06	..	..
K. & H. C. & C. 1st s f g 5s	91	..	98 Jan. '13	98	98
Pocah. Con. Coll. 1st s f 5s	..	86	85½ 85½	85	87⅞
St. L. Rky. Mt. & Pac. 1st 5s	77⅞	Sale	77⅞ 77⅞	73	80½
Tenn. Coal gen. 5s	99	Sale	99 100	98½	103
Birm. Div. 1st consol. 6s	..	101⅞	101⅞ Sept. '13	100⅜	103
Tenn. Div. 1st g 6s	..	102	102 Sept. '13	100½	102
Cah. C. M. Co. 1st g 6s	..	..	103 July '13	103	103
Utah Fuel 1st g 5s	..	..	.. ..	..	..
Victor Fuel 1st s f 5s	..	84	80 May '13	79½	80
Va. I. Coal & Coke 1st g 5s	92½	95	93 93	92	98

The Reading Co.—Regular quarterly dividend on the first preferred stock of 1%, payable Dec. 11 to holders of records Nov. 25.

Consolidation Coal Co.—Regular quarterly dividend of 1½%, payable Oct. 31 to holders of record Oct. 25.

Consolidation Coal Co.—According to a statement made the early part of the current year this company operates 82 bituminous coal mines. It also owns 32 miles of railroad and two thousand 60-ton steel coal cars. The aggregate of both road and cars is valued at $5,000,000.